COMMERCIAL CAR JOURNAL

with which is combined Operation & Maintenance
Reg. U. S. Pat. Off.

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"Look what the

The 1936 Bus Maintenance Award Winners

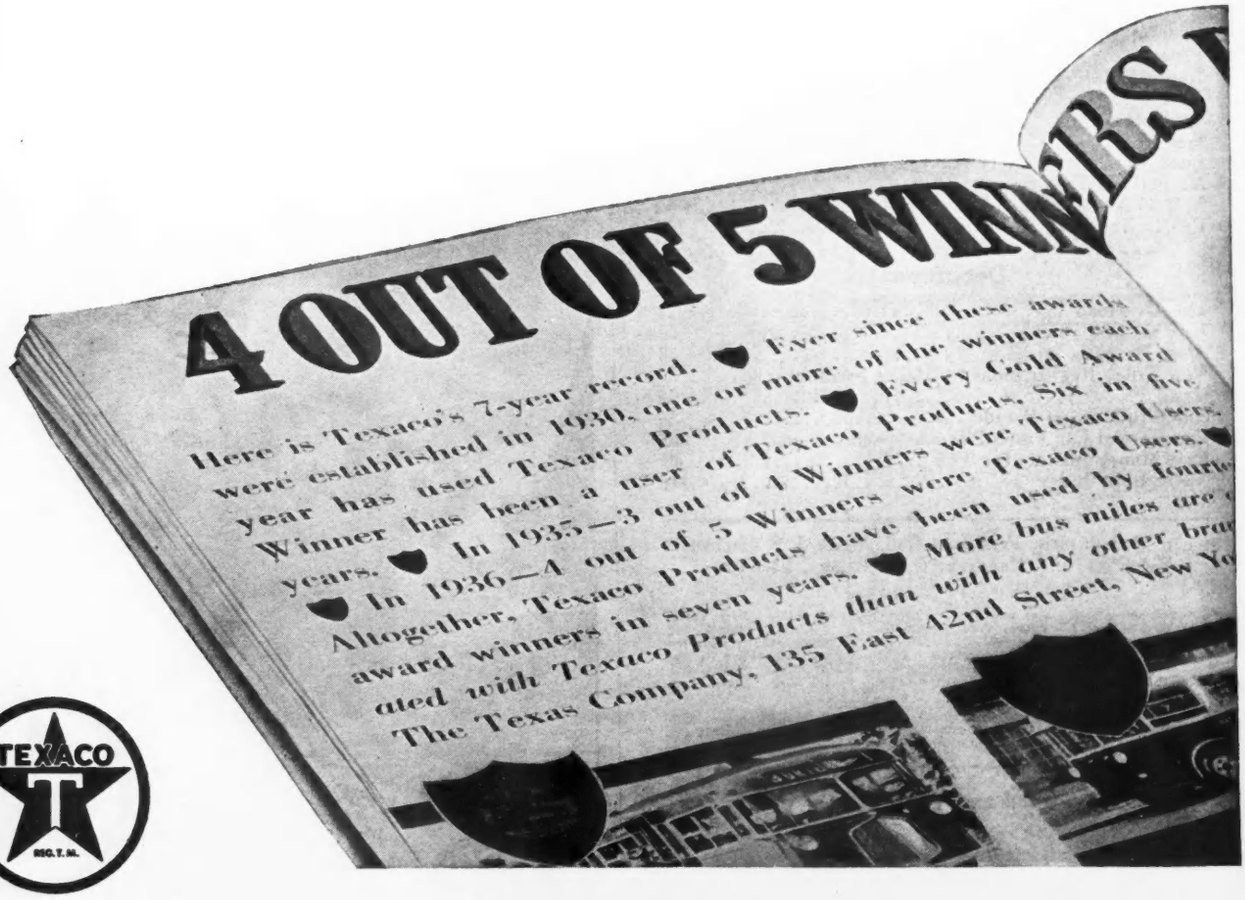
Each year the publication Bus Transportation awards gold, silver and bronze medals to the Bus Operators who have made the greatest reduction in their maintenance costs. In 1936 the winners were:—

GOLD—Greyhound Management Co. *Cleveland, Ohio*
GOLD—Motor Transit Co. *Jacksonville, Fla.*
SILVER—De Camp Bus Lines *Livingston, N. J.*
SILVER—San Antonio Public Service Co. *San Antonio, Texas*
BRONZE—Oshkosh City Lines, Inc. *Oshkosh, Wis.*

GREYHOUND used Texaco. So did Motor Transit, San Antonio, and Oshkosh.*

You can make maintenance records, too—in your own trucks—with this New Texaco Motor Oil. You will use less oil . . . get lower fuel consumption . . . because . . .

Made by the New Texaco Furfural Process it is cleansed of all harmful gum, sludge, and carbon forming elements. *More bus miles are*


4 OUT OF 5 WINNERS
Here is Texaco's 7-year record. ♥ Ever since these awards were established in 1930, one or more of the winners each year has used Texaco Products. ♥ Every Gold Award Winner has been a user of Texaco Products. Six in five years. ♥ In 1935—3 out of 4 Winners were Texaco Users. ♥ In 1936—4 out of 5 Winners were Texaco Users. Altogether, Texaco Products have been used by fourteen award winners in seven years. ♥ More bus miles are ated with Texaco Products than with any other bra
The Texas Company, 135 East 42nd Street, New Yo

TEXACO

New TEXACO

The COMMERCIAL CAR JOURNAL
Vol. LII. No. 5 JANUARY, 1937

Overload

Explanation Not Apology

So many new truck announcements piled in on us this month that for a while we thought it would be necessary to get out a supplement to our November Show Issue. Fortunately the flood subsided and we were able to plan an issue that was not badly out of balance. So prepare yourself for a liberal serving of descriptive articles; and be sure to read them because they are important. If you miss The Album department just be patient and you'll find it in its accustomed place next month. We held it out because we felt that the new truck descriptions represented enough "modern transportation equipment" for one issue.

A Believe-It-Or-Not

You may not agree, but the most enterprising article in this number is that dealing with the 1937 economy packages available to fleets on passenger cars. Believe it or not, this is the first time an article of this kind has been prepared and published. From now on you may expect it as an annual feature. The illustrations were rush jobs but we hope they don't look it. All of them were taken especially for this article and a number of them had to be snapped right out on the proving grounds. The factories cooperated splendidly with us and we thank them.

Hunt Hints—Find Fives

The new batch of Shop Hints this month reminds us to remind fleet men that until further notice we will continue to solicit their unusual shop ideas and will continue to pay $5 for every one accepted. Look around your own shop and don't pass up ideas just because you think they are old stuff. Let us be the judge of that. Don't be ashamed to send us rough drawings. Our artists will doll them up. And if you can't take your own snapshots, let us have the idea and if we like it we'll arrange to have a photographer call around at our expense. That, we'd say, is about the easiest way of making $5—and more— in this business of maintaining fleets.

More Power to Us

Domestic motor fuel consumption hit a new record in 1936 with an estimated 20,118,000,000 barrels, a 10 per cent jump above the 1935 peak. With retail sales taxes on gasoline now averaging nearly 40 per cent, the tax collectors derive the greatest financial benefit from the production and consumption of this commodity.

Questions and Answers

Is American automotive engineering superior to foreign engineering? Ask that question of Col. H. W. Alden, chairman of the board of Timken-Detroit Axle, who has just returned from an extended European tour, and he'll reply: "The best way to answer that question is to say that most of the foreign engineers I came in contact with were driving American manufactured automobiles." Ask him about diesels and he'll tell you that most trucks and commercial vehicles are diesel powered in Europe today, but that there is no trend toward using diesels in passenger cars.

These drivers employed by member fleets of the New Jersey Truck Association have earned awards as safe truck drivers in their safety contest recently ended. They are: (top down) Lester Smith, 333,157 miles in 16 years, Standard Oil Co., N. J.; Nicola Mulinari, 500,000 miles in 9 years, Carlo Trans. Co., Newark; Michael Stigliano, 231,000 miles in 18 years, Bamberger & Co., Newark; John Tefts, 300,000 miles in 12 years, Riteway Express, Westwood, N. J.; Wilbur Jaasma, 120,000 miles in 4 years, Little Falls Laundry, Little Falls, N. J.; Morton Penson, 500,000 miles in 9 years, Garford Trucking Corp., South River, N. J.

•

This 2½-ton Schacht truck shown below is operated by W. R. Vansant of Hazard, Ky., as a gypsy barrel stave mill. It totes a line shaft, equalizer saw, listing saw and blower driven by a 60 hp. Fairbanks-Morse diesel. The truck moves among the white oak forests of Tennesee and Kentucky.

The Overload

Smoke in Whose Eyes?

THE other articles need no explanatory comment. But we do want to point out that "Dope on Diesels Down to Date" represents material originally presented by the author at the Newark Truck Show sessions of the Metropolitan S.A.E. section. After some correspondence Mr. Blackwood gave us a copy of his paper, we edited it with his approval and now it's yours. We've been on top of diesel developments since 1929 and we recommend the article for its up-to-the-minute informativeness. Back of the smoking diesel illustration there's a little story. "Get action picture of smoking diesel out on road" we wired our Los Angeles man. "Modern diesels don't smoke" he wired the next day, but apparently he kept looking because he got what we wanted. As Mr. Blackwood points out the operator must assume the responsibility for the smoking.

About Face?

THE headache of army specifications and the irritation of army experimental design which plague many truck engineers must have found a welcome palliative in the suggestion of General Johnson Hagood in the Dec. 5 *Saturday Evening Post.* In an article entitled "We Can Depend on America," the General wrote: "We should be prepared to secure auto transportation of ordinary commercial design, such as can be picked up on the street or produced in quantity without any changes in our factories. It will be much better than the obsolete stuff that the Army will have accumulated in time of peace, and the problem will be to withdraw it from commercial use without paralyzing industry behind the lines. That problem should be solved in advance. The so-called prime movers—that is, the things that haul the artillery, and so on—should be ordinary commercial trucks or tractors, and our artillery carriages should be designed with that in view."

Help! Help!

WRITES a large fleet operator: "We are interested in getting facts and figures on the use of light, panel delivery trucks by traveling sales representatives of large companies. We would like to know what advantages other companies have found in delivery trucks over passenger cars for their salesmen, what large companies are using trucks, and how operating and initial costs compare with passenger cars. Information on how large a territory can be covered and on monthly mileage averages would also be pertinent." This is the sort of information we would like to publish, so if you operators with experience would like to help your brother operators, send us the right answers and we'll print them—as usual with or without names, depending upon your wish.

The Queen of Parts!

THE only woman wholesale parts salesman (saleswoman) in the Ford Motor Co. organization is the distinction held by Miss Virginia Carabin of Port Arthur, Texas. She drives a Ford truck over a 45 mile route selling Ford parts wholesale to independent garagemen, service stations and fleet owners. She is also the prettiest femme in the organization, and since she is the one and only and thus has no competition, there will be no argument on that score.

Ethyl Goes a-Testing

OUT to improve the performance of engines and fuels, the Ethyl Gasoline Corp. is putting a fleet of trucks and semi-trailer units through some gruelling tests in the mountains and valleys of Southern California. The gross weight of every truck and trailer combination is 34,000 lb. One truck already has travelled 150,000 miles. Besides 8 tons of sand and gas tanks with a capacity of 200 gallons, each unit carries a load of special instruments, too numerous to mention, as we say when cramped for space.

Southern folks in Ol' Virginny where the Arlington & Fairfax Railway operates just south of Washington, D.C., are getting a treat in transportation with this auto-railer which will operate either on tracks or the highway. Illustrated is one coach of a fleet that replaces all electrical equipment on the line. It is a product of the Evans Product Co., Detroit.

He Sent Us Compliments

WE envy the drivers of the South End Express Co., truckers for the Newark (N. J.) *News.* President Louis Kramer gave 23 of them a bonus of $100 each for having finished the year without an accident, and gave six others $50 for having had only minor accidents. Bonuses of $100 for efficient service were given to John Flannery of the fleet maintenance staff and John Graf, body builder. Mr. Kramer, apparently, overlooks no deserving employe.

And We Send Wishes

TO all our reader-friends who remembered us at Christmas with greeting cards, we say "Thanks"; and may they enjoy health and contentment in the New Year. Yes, to all of our readers we wish the same.

10-13-36-200,000 (6 2813)

DAILY TIME RECORD TO BE KEPT BY OPERATOR OF MOTOR TRUCK OR MOTOR BUS

Driver's Name____ Address____ Driver's License No.____

Vehicle Operated: Truck____ Bus____ Registration No.____

Employer's Name____ Address____

RECORD FOR: Day____ Month____ Year____

Last went off duty in____ at____ A.M.____ P.M. Date____

Began duty in: City or Village____ State____ at____ A.M.____ P.M.

Did you operate outside radius of 40 miles from place where duty began? Yes____ No____

Ended duty in____ at____ A.M.____ P.M. Total hours worked____

RELEASED FROM DUTY DURING DAY
(Use other side if necessary)

From____ A.M. to____ P.M. Reason____

From____ A.M. to____ P.M. Reason____

DELAYS CAUSED BY ACCIDENT, ACT OF GOD OR OTHER UNFORESEEN CAUSE
(Use other side if necessary)

From____ A.M. to____ P.M. Reason____

From____ A.M. to____ P.M. Reason____

RECORD ONLY FIRST AND LAST CROSSING OF STATE LINE

Entered New York State: Place____ Date____ at____ A.M.____ P.M.

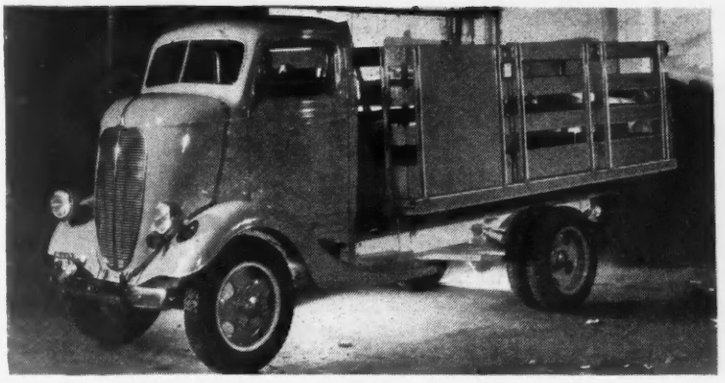
Departed from New York State: Place____ Date____ at____ A.M.____ P.M.

Operator's Signature____

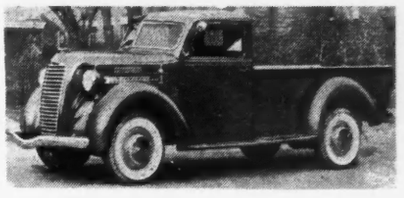
ENFORCEMENT OFFICERS: State time, date and place examined on other side and sign name and title.

This is a sample of the form truck and bus operators of New York state will have to supply themselves and keep for every driver in their employ on and after January 1, 1937, in order to comply with the new labor law passed by the N. Y. state legislature. Drivers must take 8 hours off after a 10-hour trek.

Ears to the GROUND



Add this smart Ford camel-back conversion to your album. It's the neat and classy 1937 job turned out by Transportation Engineers, Inc., Detroit. If you want complete details before they are publicly released just check "B" on the coupon below



The handsome Diamond T Model 80 ¾-ton chassis steps out with an all-steel pick-up body with an inside width of 46 in. Sides extend to form 5-in. flares and rise 14 in. from the floor exclusive of the flare which gives a total height of 17 in. Tailgate is 14 in. high and floor of body is 32 in. from ground. Chassis wheelbase is 119 in.

New Year Note

This department has cheering news with which to greet the New Year. A company already famous for its passenger cars will unleash a complete new line of trucks of lighter capacities, and will supplement the truck activity by offering a line of commercial cars.

Model Motif

Not to be outdone by any newcomer one of the old line truck manufacturers has redesigned his entire line of trucks. The first thing that you will notice about the new models is their good looks. Of course, the mechanical changes are many and varied and you will have to wait for the new model announcement which should appear in the February issue.

Additional Aspect

This thing just goes on and on. There are two reports that two other important manufacturers have new lines to announce early in the year but here our midwest sector spy becomes a bit vague and until later even this department will not have the salient features of the new models.

Piston Particulars

That new piston that has been mentioned in this department's dispatches several times is about to make its appearance. It is an alloy piston that can be fitted closer than a cast iron piston. Odd design of the alloy portion and cast in nickel steel bands is the reason. It has, so our advices go, no self-imposed friction.

Hardware Hearing

Just as this department was attempting to persuade the print shop foreman to rush this copy through before the holiday, an inventor found his way through the editorial rooms to our desk. He has a double door latch that works automatically when the outside door handle is turned and one door is opened. The other opens automatically and both will stay open in a fixed position and they can be released to open all of the way. He is open to ideas on merchandising and manufacturing connections.

Design Declamation

From a new and totally unexpected quarter comes a voluntary report that three men, an engineer, a draftsman, and a fleet operator working on their own have designed a camel back unit that is just as stable as a conventional truck and with greatly improved steering and riding qualities. They, too, are open to suggestions.

Lining Layout

One of our spies had demonstrated to him a method of supplying clutch facings of odd sizes. The facing material comes in slabs and a piece of shop equipment which consists of a power saw and jigs to make accurate cutting possible is used to cut the clutch lining out of the slab, the remainder of which can be used for linings of larger or smaller size.

Ozone Outfit

The agile mind of this department was stumped when one of our spies began to tell us about an ozone generator until he explained what it was for. By dampening the floor of a food truck and turning the ozone generator loose on the job a thorough job of sterilizing and deodorizing can be done in a fraction of the time required to do the job chemically. In addition the minute the body is open to the air the ozone is dissipated and there is no waiting time to get rid of the chemical effects.

Door Division

Another inventor this time with an overhead door that stays up at various desired heights has called on this department for advice on merchandising or selling outright his idea. The ideas have it this month.

Lubricant Label

A spy was interrupted at his work and consequently we are able to tell you that one prominent lubricant maker is about to introduce a special fleet lubricant but we are not able to go into detail.

FREE

Mark with an X and mail, as usual, to The Editor, Commercial Car Journal, Philadelphia, Pa.

- ☐ **A—"Serviceology," a free service consisting of a binder and monthly bulletins containing reprints of technical articles.**
- ☐ **B—Complete details on Ford camel-back conversion.**
- ☐ **C—Bulletin detailing disadvantages of improper weight distribution and springing.**

Name .....

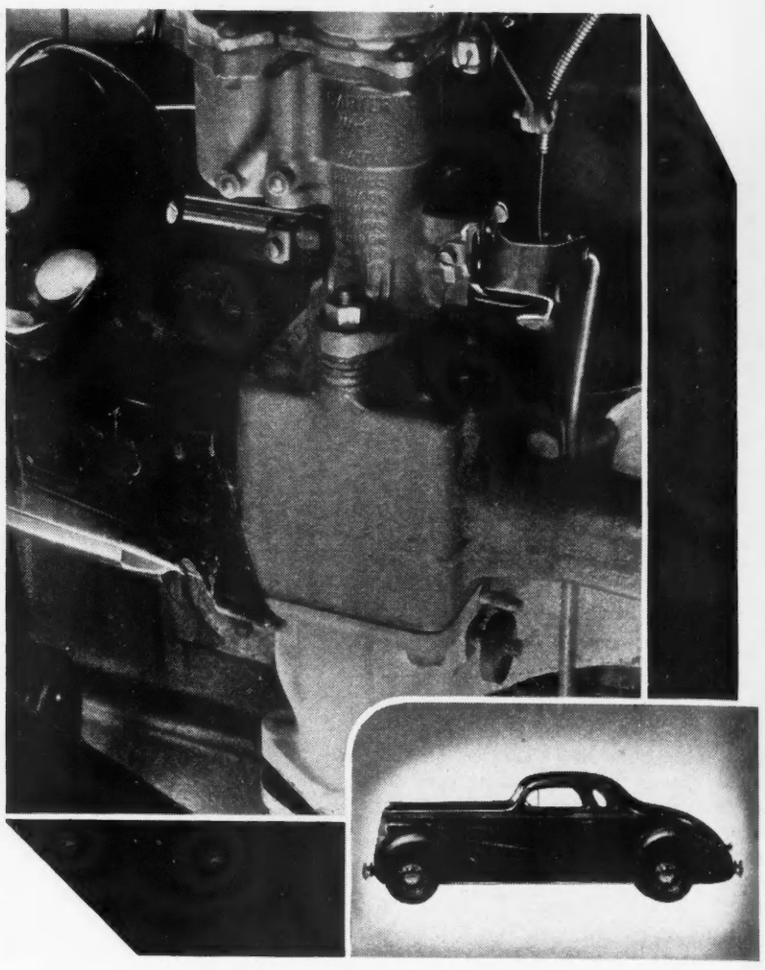
Title .....

Firm Name .....

Address .....

City .....

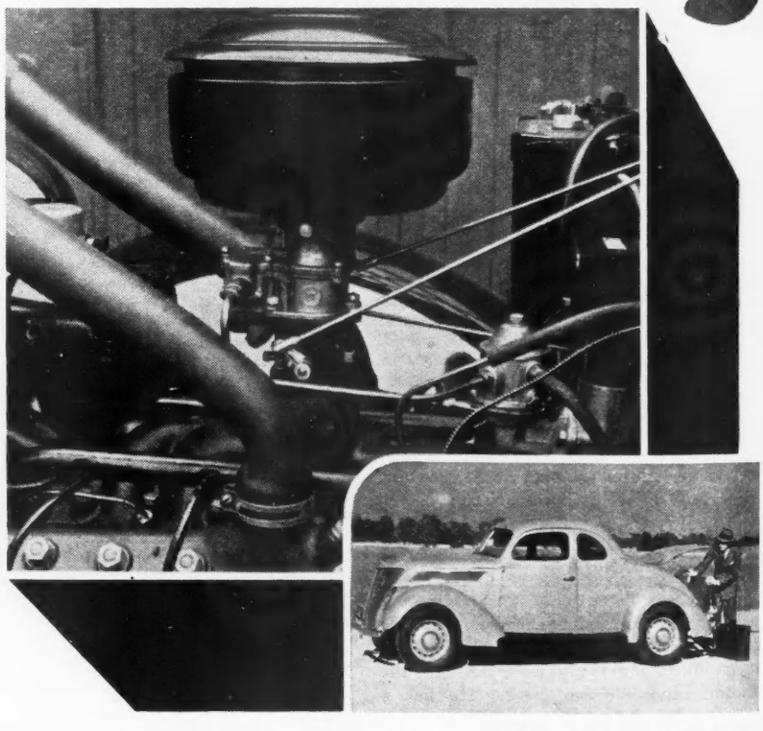
No. Trucks ..... **No. Cars** .....



1937 Economy

FLEETMEN who operate passenger cars, particularly on the larger operations, have been striving for years to squeeze the last bit of economy from automotive equipment. No end of ingenuity has been applied by way of detail specification changes on standard passenger car chassis to make these units conform to the special performance requirements and operating economies desired in fleet work. This has applied in particular to company cars used by salesmen in covering their territory, for special parcel delivery, and for various other special purposes.

For company cars, the fleetman has found it desirable to impose on the standard passenger car chassis some of the special features which would give less performance but more economy. When it comes to actual economy features, the fleetman has been the first to realize that you can't get something for nothing. If you start with a modern motor car designed with a view to the kind of performance that the public wants it is necessary to sacrifice much of the performance characteristics if greater economy is desired. In other words, you can't have both high performance and high economy—you have to make up your mind on a reasonable compromise.



AS a matter of fact, for fleet cars, the choice has not been hard to make, since we start with a unit whose road speed is definitely checked to some relatively low speed consistent with the legal speed limits of a given community. Since both engine speed and engine power are limited thereby, it's but a

As part of its economy package, Chevrolet offers a throttle stop, shown at far left. Ford offers a special economy carburetor (left bottom). Plymouth offers an economy engine equipped with manifold heat shields and throttle stop (left)

Packages FOR FLEETS

Passenger Car Makers Make Optional Items Available to Fleets Seeking Economical Operation

By
JOSEPH GESCHELIN
Detroit Technical Editor,
Commercial Car Journal

logical step to make the changes in the engine fittings that will produce the best efficiency from the reduced engine rating.

So the fleetman has specified smaller carburetors or smaller jets and venturi in the standard carburetor. He has installed throttle stops and made timing and valve clearance adjustments. And, finally, he has specified smaller rear axle ratios so as to reduce engine speed for a given road speed, thereby reducing engine wear, tire wear, and gas and oil consumption. Moreover, by reducing engine speed it has been possible to operate the engine within a more efficient range consistent with reduced power capacity.

It is evident that as these specification changes accumulated the performance so far as top speed and acceleration are concerned has been willingly sacrificed on the altar of economy.

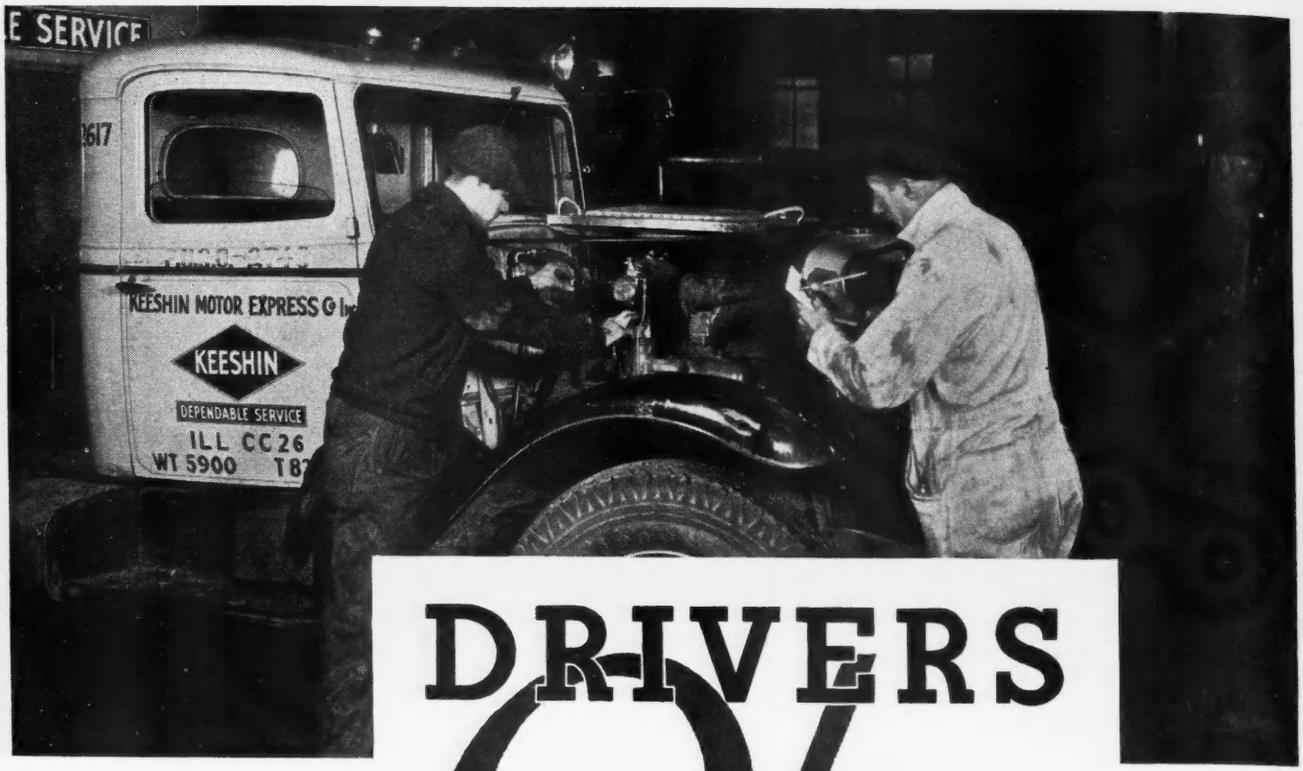
Now the interesting fact about the whole situation is that once the fleetman established a certain standard for his equipment, the passenger car producers began to fill requirements by introducing options which gave the desired results at much lower cost than was possible at the start. This has been a development dating back some three years.

If we start with the proposition that the fleetman wants both economy and low first cost, we note that the tendency is to buy the passenger car models in the very lowest price bracket. This narrows the real fleet economy market to Ford, Chevrolet and Plymouth. Only Chevrolet, Ford, and Plymouth offer special economy packages for their new models.

SUPPOSE we take a look at Chevrolet for 1937. This company has recognized the fleet economy problem for the past three years and this year it offers several economy packages that will be added at the factory whenever specified by the customer. A feature of the options this year is a complete engine package with all the economy features built into it as a factory proposition and not as an afterthought.

These economy models are identified

(TURN TO PAGE 92, PLEASE)



DRIVERS Okay

Driver Inspector's Report

Date .....Terminal .....Name .....
Age....Address....Yrs. Experience....
Does he have driving sense?.....
Is he inclined to speed?.....
Does he slow gradually or hard?.....
Does he drive at steady speeds?.....
Dim lights when necessary?.....
Do approaching lights bother him?....
Does he cross center line on road?.....
Any trouble staying awake?.....
Is he alert at all times?.....
Does he crowd the vehicle ahead?....
Does he try to beat lights?.....
Does he obey traffic laws?.....
Is he impatient and takes chances?....
Wait for clear road when passing?....
How does he handle clutch and gears?
Shift to neutral on down grades?.....
Is he cautious?.....
Can he put out emergency flares?.....
Stop too often when on road?.....
Does he keep eyes on the road?.....
Does he check lights on road?.....
Does he abuse the equipment?.....
Does he cut in when passing?.....
Is attitude towards company O.K.?....
Did he suggest taking a drink?.....
Does he take chances at R.R. crossings?
Would you hire him as a driver?.....
Does he meet Keshin driver standards?

OUR Company has developed a plan whereby much of the responsibility for the proper maintenance of our individual trucking units is placed on the drivers of these units. This plan, first started about three years ago, has been so effective—even while we have been rapidly expanding our operations—that we today have eliminated practically all road failures and practically all accidents which could be charged primarily to the mechanical condition of the equipment.

The development of our plan has been closely associated with our company accident prevention activities; but we have always considered accident prevention as purely an operating problem. Most accidents can be charged as operating failures—due to faulty equipment, wrong driving practices, or failure on the part of the supervising management. Thus, we have always assumed that our primary problem, in our accident prevention program, was to see that our equipment was kept in the proper mechanical condition.

At first, one of the chief obstacles to this end was a divided point of view on the part of certain department heads. They knew the importance of accident prevention, but they also were so anxious to make good economy records that they sometimes would hesitate, or neglect, to make equipment expenditures really needed for the best safety insurance. Then when accidents would come, it was often hard or impossible to find out actually who had been responsible for the unsafe condition of the equipment.

EQUIPMENT and KAYO ACCIDENTS

By C. R. OLSON
Vice-President, Keeshin Motor Express Co., Inc., Chicago, Ill.

Keeshin Plan Places Responsibility of Checking Equipment On Drivers With Result That a Quick Knockout is Scored Over Accident Hazards

So about three years ago we started our new "Unit Inspection" plan. The basis of the plan is to require every driver, in close cooperation with an official company inspector, to make a thorough inspection of the truck which he will drive, every time this truck leaves a terminal. The driver is given a stiff card, five inches by eight. On it is recorded name of terminal, date, exact hour of inspection, and number of tractor and trailer or truck.

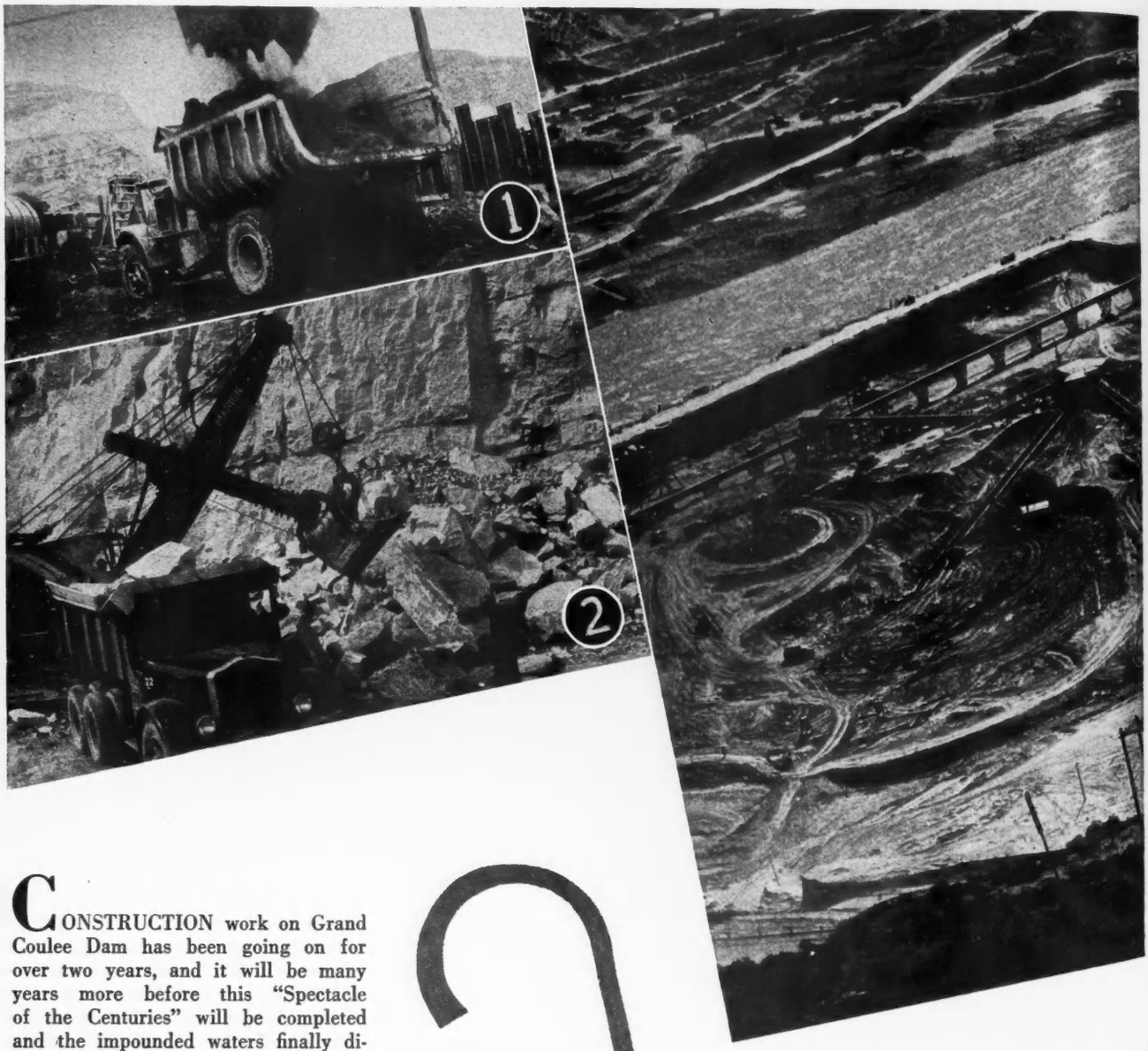
Under this is the statement: "Following items have been inspected on units shown, prior to leaving terminal or garage and are O.K. and serviceable." The items which he must O.K. are: Head lights; front marker lights, rear marker lights, tail light, side marker lights; Brakes: foot brakes, emergency, rear view mirror, wheel studs, tire inflation, spare tire, seals.

Then another statement: "Following equipment was in my possession in serviceable condition at time of departure." These include: 3 pot flares; Filled—6 railway 10 minute red fuses, 3 red lanterns; Filled—side marker lights, red and green; fire extinguisher, filled.

Under the original plan this card was simply signed both by the inspector and the driver. And at the bottom was the instruction that "This card must be turned over to inspector at time of departure without fail. Driver will not take unit out until inspected and card signed. Not necessary to show Seal Nos. All items must be checked."

But on our latest revision of this card, the driver must certify that "I have personally inspected the units listed above and accept them as being in good condition and safe to operate. I have

(Turn to Page 106, Please)



The GRAND

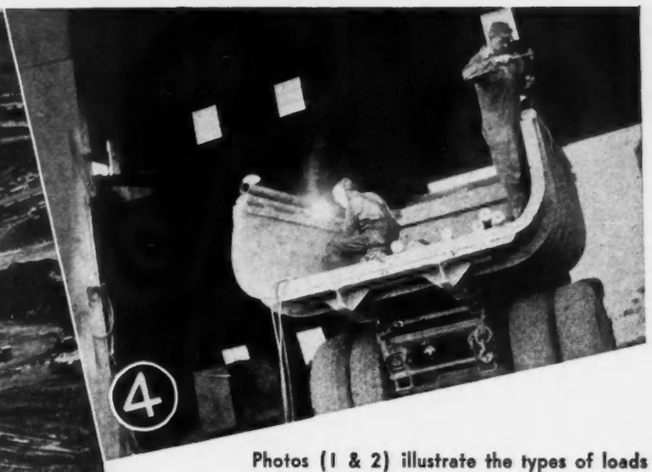
CONSTRUCTION work on Grand Coulee Dam has been going on for over two years, and it will be many years more before this "Spectacle of the Centuries" will be completed and the impounded waters finally directed down through the Grand Coulee and out onto 1,200,000 acres of what is now semi-arid but extremely fertile land, in central Washington. Any attempt to outline, even briefly, all of the accomplishments of automotive vehicles since the beginning of operations would end in a mass of complexity. Those phases of the work upon which the contractors are now engaged, in the Fall of 1936, will be discussed.

We are operating a large fleet here at Coulee under conditions that are in many ways exceptional. What the trucks and tractors are doing, and how they are operated, maintained and serviced is, we believe, interesting.

To build this dam in the gorge of the Columbia River, called for the removal of approximately 15,000,000 cu. yd. of earth and rock. This was too much to expect of trucks alone, within reasonable time, so a great conveyor belt system was installed for earth excavation. Even to feed that mechanical gourmand was job enough for trucks and tractors. But now that its work is done and it stands idle, we still maintain a fleet of practically the same proportions for other phases of the work as they come along, which always seem to call for trucks and still more trucks.

COME on out on the job and take a look down into the "holes," one on each side of the river, and let's take an inventory of the fleet that is working there.

The grand total of automotive equipment including caterpillar tractors is 117 pieces. The work being done by them at present is the removal of rock from the east side excavation, earth from the west side coffer dam area preparatory to the coming diversion on that side, haulage of timber for cribs, the building of the connecting or channel coffer dam and the continual movement of material and supplies into the east and west side areas.



Photos (1 & 2) illustrate the types of loads under which trucks must stand up. Mud or rock, it's tough on equipment. (3) Scene of truck equipment's endurance test in the state of Washington, better known as the Grand Coulee Dam project that will harness the turbulent Columbia River. (4) Capacity of truck bodies was increased by welding rows of 3-in. pipe to the upper edge

COULEE Dam

IS A GRAND GRIND FOR MOTOR TRUCKS

Men and Machines Pit Skill, Strength and Endurance Against Mud and Abrasive Dust in Construction Project to Reclaim a Million and a Quarter Arid Acres

By J. V. DEVINE, Charge of Maintenance and Equipment, Mason-Walsh-Atkinson-Kier Company, Mason City, Wash.

Necessarily, some organized plan of operating and maintaining this equipment must be followed. Coming under the general supervision of the master mechanic's department, the work is subdivided as follows:

Truck and caterpillar shop—Mort Lederer, truck shop foreman; Paul Patrick, caterpillar shop foreman.

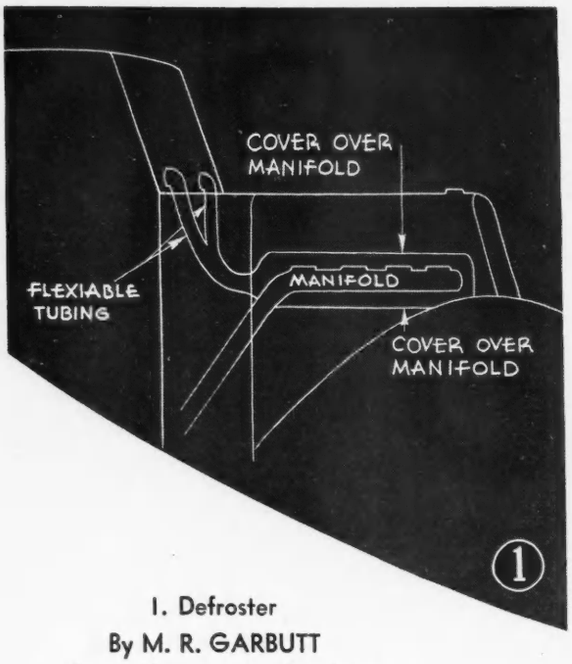
Pick-up truck and passenger car transportation maintenance; tire repair shop; steam cleaning and paint dept., Jack Douglas, foreman.

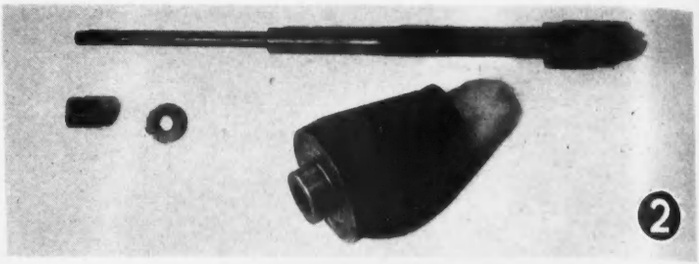
General machine shop, C. Rouner, foreman.

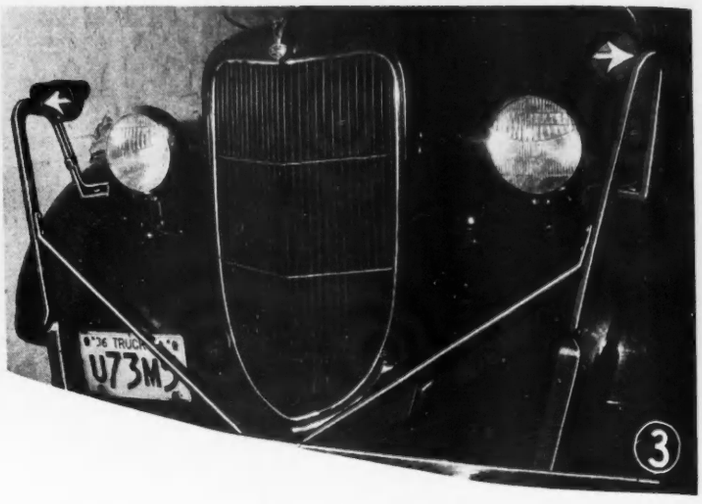
Welding department, M. H. Cole, foreman.

Lubricating department and oil

(Turn to Page 98, Please)







1. Defroster

By M. R. GARBUTT

Orange Transportation Co., Inc.
Salt Lake City, Utah

TO overcome windshield frosting and freezing we have made a heater that works very well even in extremely cold temperatures of 35 and 40 deg. below zero. Using light tin I made a cover to go over the exhaust manifold making a funnel at the front end to catch the fan blast. Then I brought the rear end of the cover down to a 2-in. round opening. Using 2-in. flexible tubing the heat is conducted up through the cowl running to within an inch of the windshield.

Below the cowl I made a Y joint in the tubing using a plumbing trap and 1¼ in. tubing for both legs of the Y. This gives a hot air outlet for both the driver's side and the passenger's side of the windshield. The hot air blast is not noticeable on the windshield on the hot days but the whole cover is made so that it can be removed very easily when the cold weather is over.

3. Radiator Bumper

By OTTO BYRN

Armour and Co., Baltimore, Md.

TO protect headlights and radiators as well as support directional signals we have installed a shop made bumper on our trucks. It is forged of 1¼ in. strap iron. Two pieces run from the outer bumper bolts which support them upward high enough to make a loop that protects the headlight and from that point they come down and the end of each piece lays along the fender for 2½ in. just over the fender bracket to which it is bolted. The directional signals are mounted at the top of the loop.

The two pieces are supported by a one piece "V" member made of ⅝ in. round stock flattened on each end for bolting and at the center for bolting to the center bolt of the bumper.

2. Valve Guide Puller

By C. E. GOLL

Fleet Manager, John Wanamaker,
Philadelphia

WE have made a puller for removing valve guides which makes it possible to remove the guides when the engine is in the frame and it is impossible to drive them out. The puller consists of a rod ⅝ in. in diameter and threaded 5⅞ in. from one end. There is a nut to fit. Beyond the threads there is a 2⅞-in. portion of the shaft that is not threaded and then a shoulder which reduces the diameter of the shaft to a size that will just give clearance in the guide that is to be pulled. Five inches of plain rod of valve stem size and then 1-in. threaded with a nut and flat washer.

There is a tapered cone which slides over the threaded part of the ⅝-in. section of the rod and the thread is slotted and the inside diameter of the cone is keyed to act as a guide. At the base of the cone there is a shoulder which reduces the base enough to make it enter the valve port. To pull the guide the rod is inserted and the bottom nut and flat washer is installed. The cone is put on the top of the rod

Shop FROM

Illustrations are of (1) Defroster, by M. R. Garbutt; (3) Radiator Bumper, by Otto Byrn; (2) Valve Guide Puller, (4) Body Jack, (5, 5a,5b) Body Work Ladder, by C. E. Goll.

and then the top nut. Merely screwing down on the top nut will pull the guide.

4. Body Jack

WE took four pieces of 1½-in. angle iron and cut 1⅝-in. steps in the edges. The steps are 5/16 in. deep. We assembled the four pieces angles inward and blocked them apart with about ½-in. wood and bolt through. A small walking beam made of sheet steel with a good strong pin and two dogs with a spring between them for tension makes the best kind of a body jack. A handle lever is provided and a rack is made to keep the lever with the jack. The whole thing is mounted on a triangular carriage with three casters. The body is lifted with a good sized hook. Our lifting range is long enough to cover any need.

5, 5a, 5b Body Work Ladder

OUR body builders have a step ladder which appears to be a conventional platform ladder at the height of 6 ft. 6 in. with about a 2-ft. platform. However, another section which gives an overall height of 9 ft. is hinged to the platform so that it can be swung down and give a larger tool platform at the lower position and then swing up to give three more steps. There is a catch at the front to secure the swinging portion when a man is

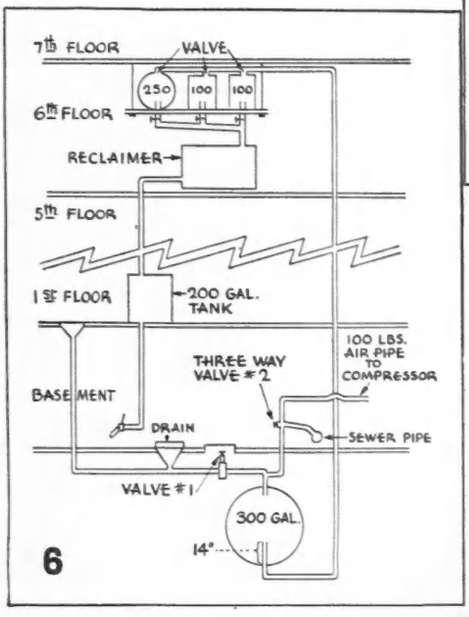
Hints

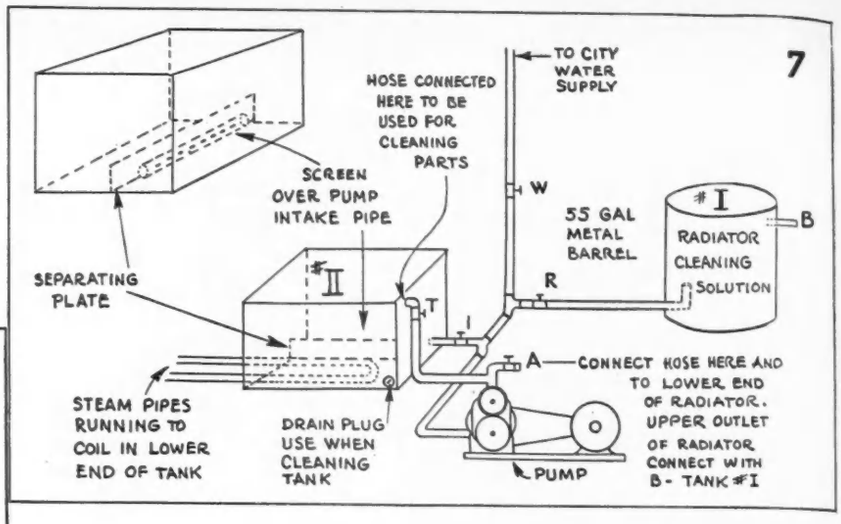
FLEET SHOPS

$5

Will Be Paid by Commercial Car Journal for Each Shop Hint Accepted. Ideas Count—No Matter How Rough. We Polish Them for Publication.

Shop Hints
FROM FLEET SHOPS





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The back upright swings toward the front when the conventional catch is released for folding purposes but is it possible for one man to move the ladder around since the front upright is mounted on casters. The casters are on the end of a bow which pivots around a horizontal member which goes through the ladder legs. By a movement of the foot it is possible to get the casters under the ladder for moving or to remove them from under the ladder when the man wishes to stand on the ladder.

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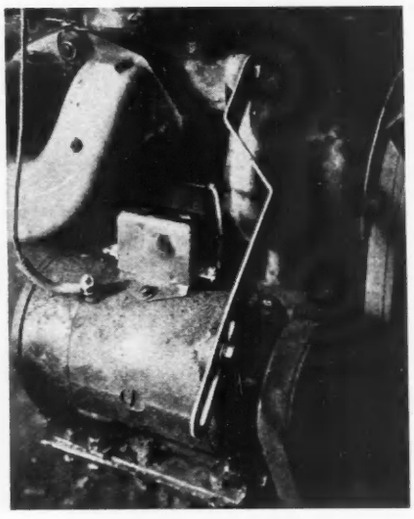
FOR several reasons it is necessary for us to drain and replenish oil in crankcases on the first floor and in the basement and for our reclaimer to be on the sixth floor. To get the oil from the drains to the reclaimer and back to the distribution points again has involved some plumbing, a diagram of which is illustrated. Our system works like this. The truck is run over the top of the drain inlet which is mounted slightly above floor level and the crankcase is drained through a valve into a tank below the basement floor. When the tank is full No. 1 valve is shut off and a three-way valve is opened to admit compressed air to the tank under the floor. Air pressure lifts the dirty oil to the storage tanks above the reclaimer on the sixth floor. After the oil has been reclaimed it returns by gravity to the storage tank for clean oil on the first floor and from there it is valved to the basement also by gravity.



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S and E Motor Hire, N. Y.

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EDITORIAL COMMENTS

After Hours

BY GEORGE T. HOOK EDITOR

A Look Behind and Ahead in Which We Consider Records and the Economic Challenge That is Already in Motion

WE are well aware that to most of our gentle readers truck industry statistics, no matter how magnificent the achievement they reveal, are one huge cipher regardless how thickly they may be sandwiched with numerals. We know that to be true even of many of our fleet friends who relish operating statistics, and who are so finicky about that sort of fare that unless it is well-garlicked with three decimal points it is practically indigestible.

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THE present occasion is no exception, although it really calls for a forthright attitude, a tone vibrant with pride, and even a bit of flag-waving, if anybody has a flag. In short, the truck industry, once more revealing itself to be a trustworthy barometer of general business conditions, crashed through in 1936 with two notable records. All of our readers helped to make the records. They helped to establish the first by means of their purchases which moved new truck sales up to the history-making total of 600,000 odd. The previous record was held by 1929 with 527,000 sales. That's approximately a 15 per cent gain no matter whose slide-rule you play with.

They helped to establish the second record by means of their increased use of transportation equipment, which boosted total truck registrations just above the 4,000,000 mark—to be exact, 4,020,000. That shattered the former 1930 record of 3,486,000 with a percentage gain of 15.318413, which is carrying even decimals a trifle too far.

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TRUCKING operators face problems that are peculiarly their own. Federal regulation so far has not been any picnic. Not because of regulation as such, but because those administering it find it the better part of wisdom to travel slowly and surely. The rate chiseler, whose death was expected to follow the birth of regulation, continues to live. His kind is common judging by the impatient complaints of many operators. But enforcement machinery is beginning to turn and relief may be expected.

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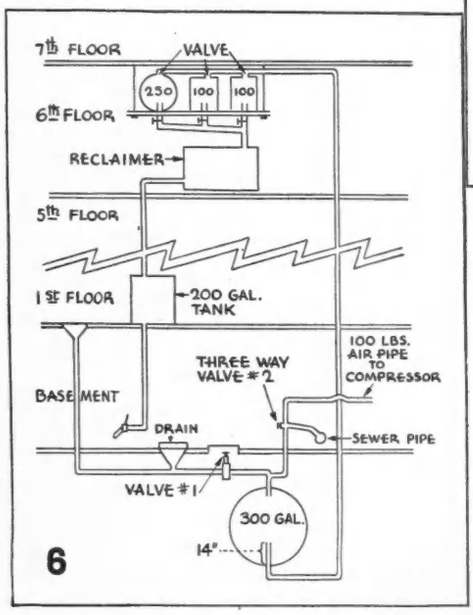

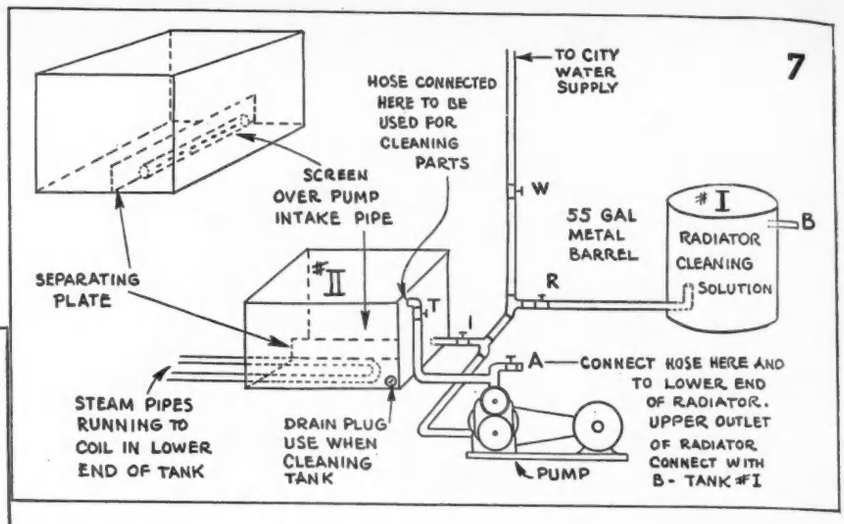

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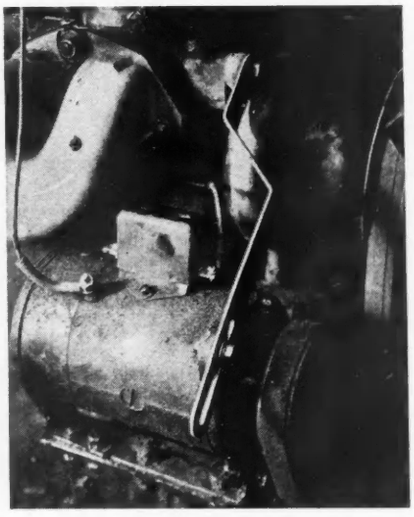

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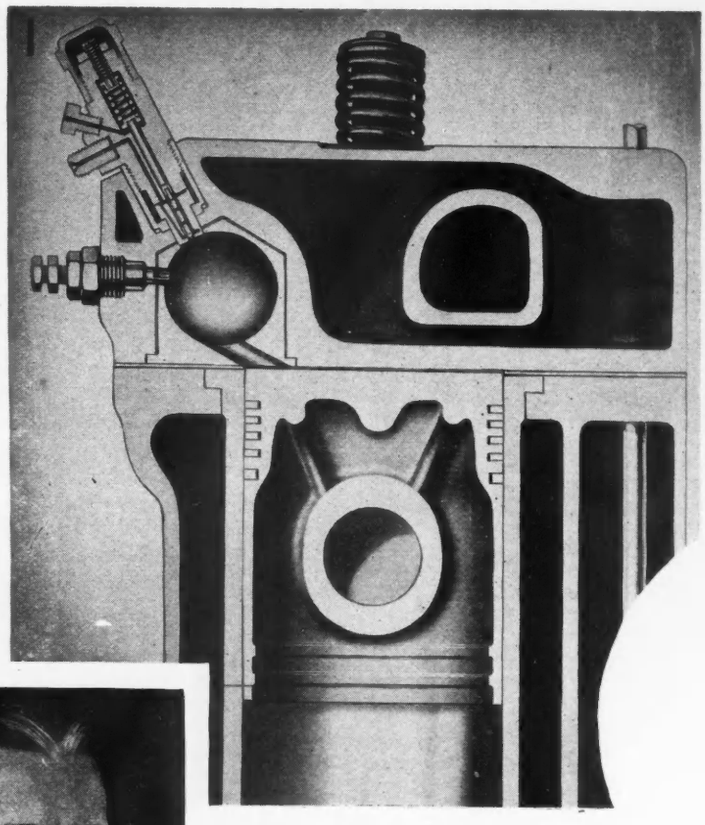


THE

Injection systems on diesels vary in design. Figure 1 shows the Waukesha type, figure 2 the Hercules and figure 3 the Cummins type.

Figure 4 shows the Mercedes pre-combustion chamber type

By A. J. BLACKWOOD
Research Engineer, Standard Oil Development Co., Linden, N. J.

FEW people in this country realize the remarkable strides being made in the development of the truck type diesel engine. The rapid growth is shown by registration figures from Germany which how that in 1931 there were 1,200 diesel powered trucks and buses and 2,900 diesel powered tractors for hauling trailers in that country. As of July, 1936, there were 32,000 diesel trucks and buses and 9,000 diesel tractors out of a total of 345,000 commercial vehicles. This does not include the hot bulb engines of which there are about 11,000 in service. Thus about 12 per cent of all the commercial vehicles in Germany are being propelled by diesel engines and at present about 90 per cent of all of these vehicles being built have diesel engines.

Corresponding figures are not available for the United States. However, an estimate made early in 1935 revealed some 1,000 to 1,200 units in road service, whereas the most accurate estimate possible at the present time would indicate that between 2,000 and 2,500 units are on the road, an increase of 100 per cent during the past 15 to 18 months. In addition, there are between 15,000 and 20,000 diesel-driven industrial and agricultural tractors in use in this country today. Thus, while lagging behind Germany in total numbers, the rate of growth of the diesel for road vehicles in the U. S. is almost equal to the rate of growth there.

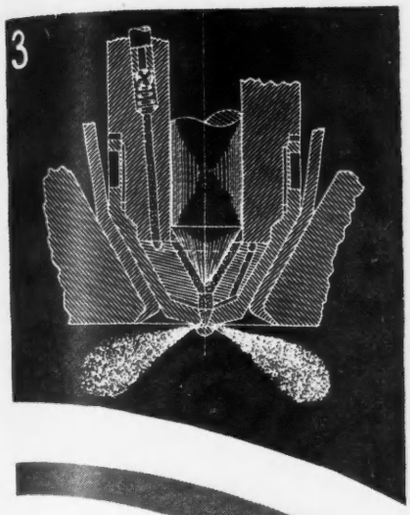
MOST engine manufacturers, both in America and in Europe, now realize that the ultimate cost of diesel fuel to the consumer will closely approach gasoline costs, and they are emphasizing the inherent economy of the diesel engine rather than the previously publicized figures which tended to overemphasize the cheapness of the fuel. It has been pointed out by others that if the same tax is charged as for gasoline and if the same distribution costs are incurred, then diesel fuel must cost within a cent of the cost of gasoline. At present 38 of the 48 states have laws so written that the tax can be collected on diesel fuel as well as on gasoline. In some localities there is talk of having a higher tax on such fuels due to the greater number of highway miles traveled per gallon.

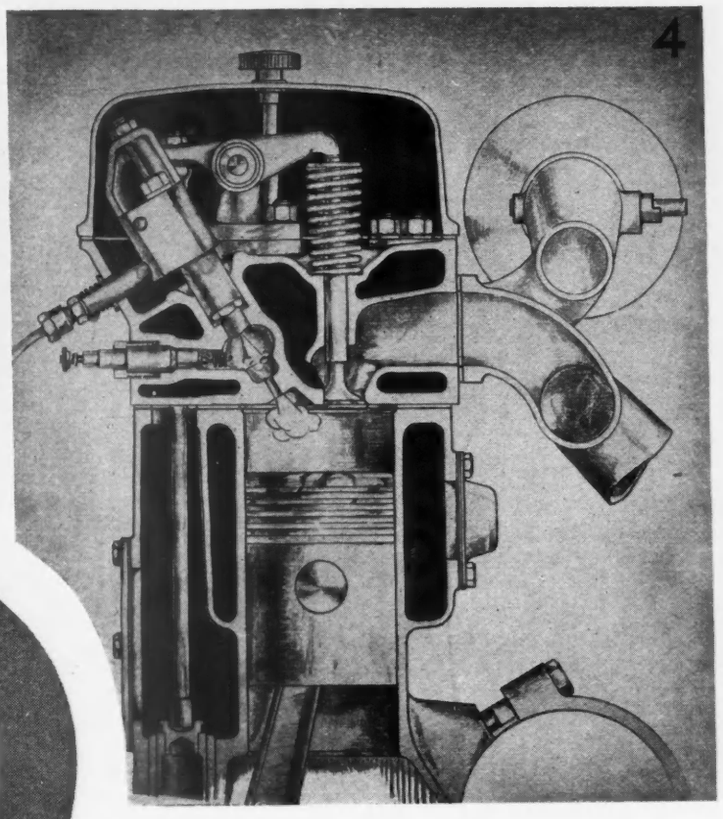
A feeling may exist that the failure of operators in the U. S. to adopt diesels is due to the inability of American manufacturers to build engines that are as good as the European engines. In the writer's opinion, it may be said that, in general, the American engine of today is fully the equal of any engine built in Europe when it comes to handling the type of service demanded of it from the American operator.

So much for generalities. In regard to more specific features, many of the changes being made or contemplated are of interest.

Combustion Chamber Design

IN Germany there is a very pronounced tendency in engine design to incorpor-

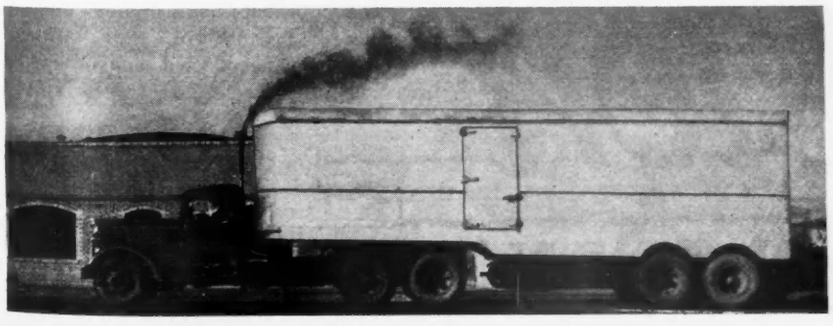




Dope ON DIESELS DOWN TO DATE

..... Including a Study of the Trends in Combustion Chamber Design, Engine Speed, Fuels and Lubrication

"On the question of (diesel) smoke it is believed that this invariably is the result of overloading." . . . Operators please note



ate some form of the ante-chamber principle. Practically every engine builder is devoting attention to the design of an engine which can utilize the low grade fuels made from lignite tars and bituminous coal tars. In the United Kingdom almost the exact opposite trend is to be observed. The ignition quality of fuels available in England is appreciably better than obtained in almost any other place in the world where high speed diesels are widely used. The result is that the direct injection engine (normally more sensitive to fuel quality) has been so successful in that country that fuel economy—the forte of the direct injection engine—appears to be forcing a trend to this type among the important engine builders. While this type of engine starts more readily than the pre-combustion engine, it suffers from somewhat less flexibility, and so far the maximum engine speed attainable has been somewhat limited.

In America most diesels embody some form of the precombustion principle. It is generally true that the diesel will

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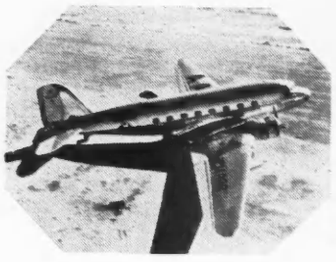
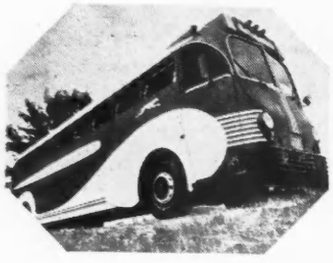
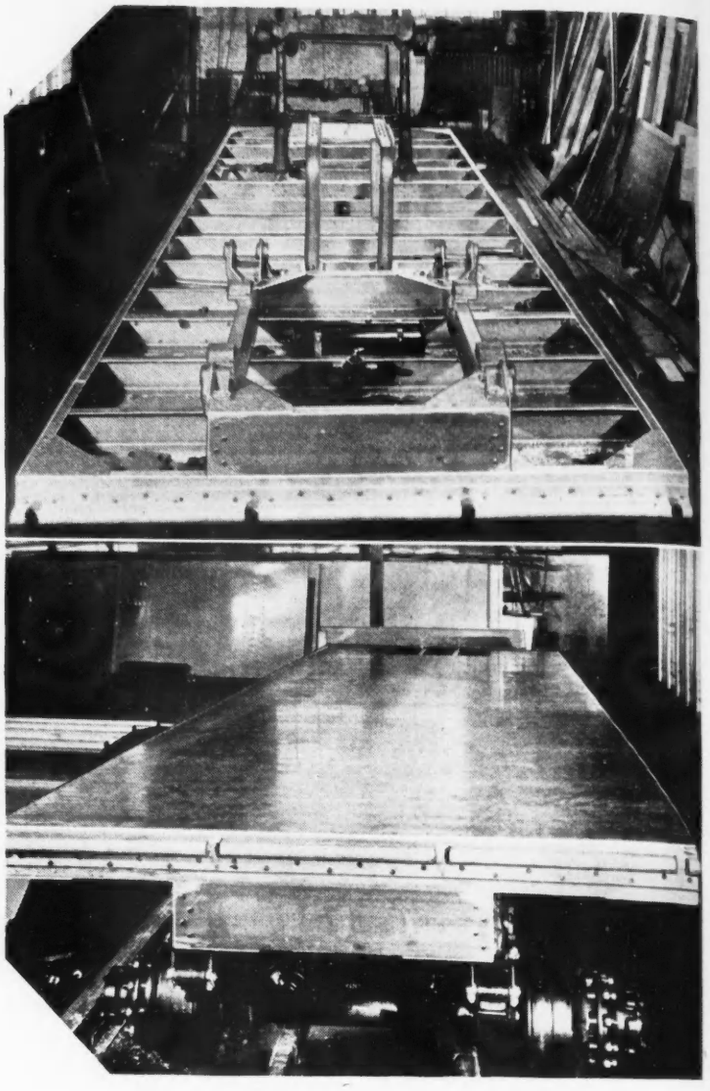


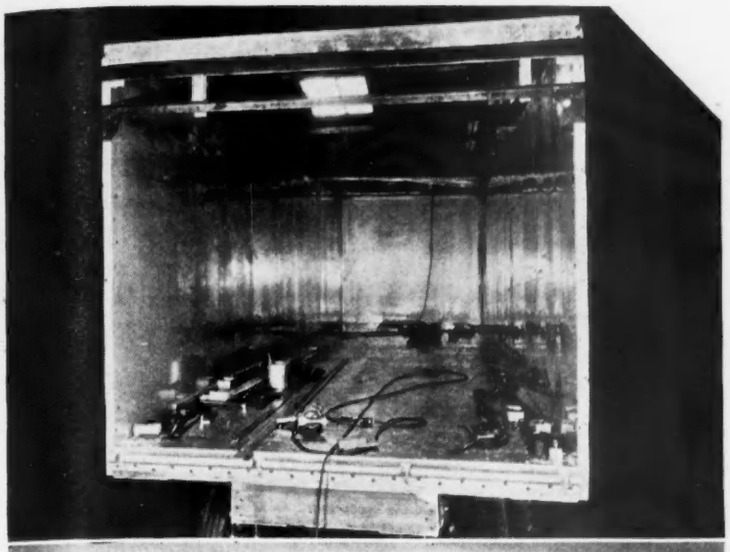


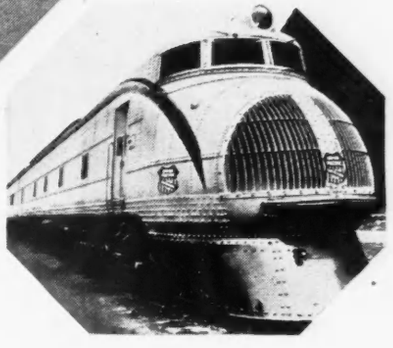


MONOCOQUE *Design* FOR MODERN TRANSPORTATION

LIGHT-WEIGHT streamlined trains, modern buses, record-breaking transport planes, and chassisless trailers all bear witness to the versatility and fundamental soundness of monocoque construction.

The first to take advantage of the efficient construction made possible by monocoque design was the aircraft industry, and today this type of construction is used extensively in transcontinental transports and the clipper ships. Several years ago, the monocoque principle was applied to trailer design because of the substantial weight-saving effected, and its use has met with remarkable success. Later





Large illustrations on the opposite page: Top—shows the subframe with running gear members, tire carrier, landing gear and fifth wheel members in place for the truck body and below it is the completed floor with springs and axle mounted. Left—(Top) shows the unit with front and side panels in place and below it is the completed monocoque semi-trailer. The small illustrations are of the "City of Los Angeles," one of the latest Union Pacific streamlined trains employing the monocoque principle; a Douglas sleeper plane, operated by American Airlines, of monocoque construction; a new Greyhound bus with Monocoque body.

Bringing You Up to Date On Chassisless Construction, in Which Body Panels Absorb Stress of Body Weight and Payload, and Its Application to Trailers and Trucks

IN the conventional semi-trailer, consisting of body and chassis, the total weight of body and payload is carried by the chassis. The body holds the load in place and serves as a protection, but practically no advantage is taken of its load-carrying ability. If excess weight were of no concern, the fact that several hundred pounds of metal in the body are wasted structurally would not be important. But when weight is a factor, as it is when most economical transportation is desired, every pound of construction material must be utilized to the fullest extent. Monocoque construction accomplishes this feat; in fact, it employs the side panels for a twofold purpose—load carrying and protection.

The ability of the side panels to carry heavy loads is not readily understood until it is realized that a side panel when riveted to the top and bottom sills becomes a thin web girder possessing tremendous resistance to stresses parallel to its surface. Any tendency for the girder to buckle is prevented by attaching stiffeners in the form of side posts. In a semi-trailer, the bottom sill is usually a channel which forms the side sill for the floor subframe. The two side sills are joined by cross-bolsters and the top sills by carlines, and after the roof and floor sheets are in place, the body actually forms a box girder capable of supporting the payload. No chassis is required, the running gear and fifth wheel being mounted on members built into the subframe.

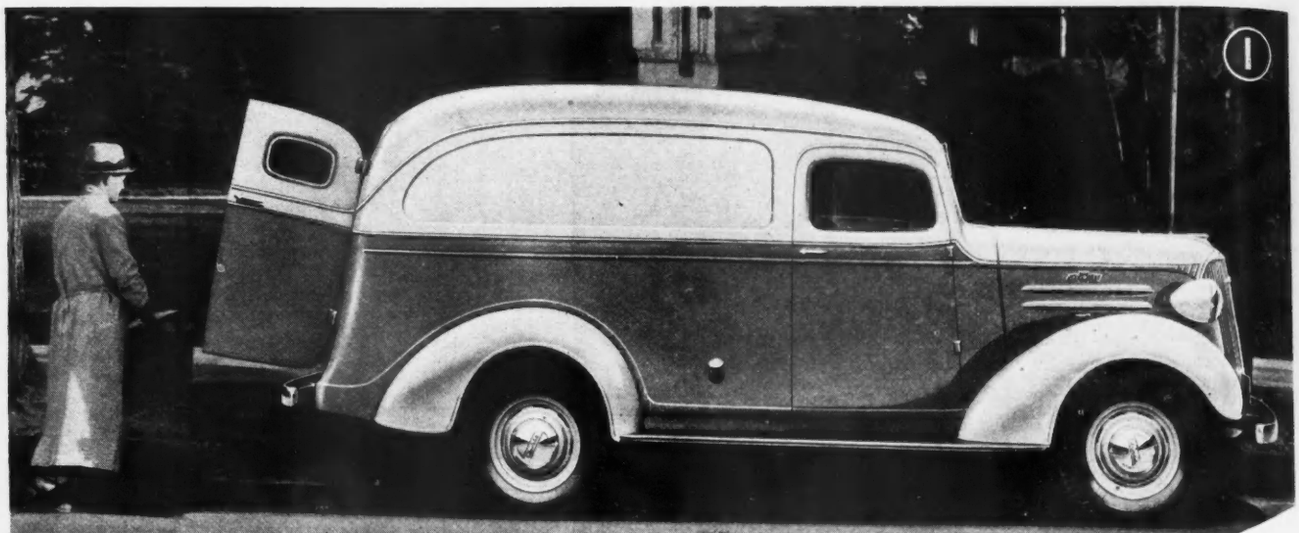
The success of the trailer depends

(TURN TO PAGE 64, PLEASE)

it was adopted in modified form by designers of buses and streamlined trains.

In highway transportation, the term monocoque is often used to include all types of chassisless construction, but to adhere to the original meaning, its use should be restricted to designs in which the side panels carry the stresses arising from the weight of the body and payload. This method of carrying the load is the outstanding feature of monocoque construction and is responsible for drastic weight savings.

IN trailers, monocoque construction is the principal type of chassisless construction in use, but in buses and trains, as well as some semi-trailers, a truss type is sometimes employed. Operating conditions govern the extent to which either type can be applied to any one unit. Among the most notable examples of trains and buses employing the monocoque principle are the Union Pacific streamliners and the new Greyhound buses. The Burlington zephyrs and the Gar Wood coaches incorporate a truss design.



Chevrolet

Better Load Distribution, New Engine With More Horsepower, Increased Torque, Improved Springing Are Some Features in New Models

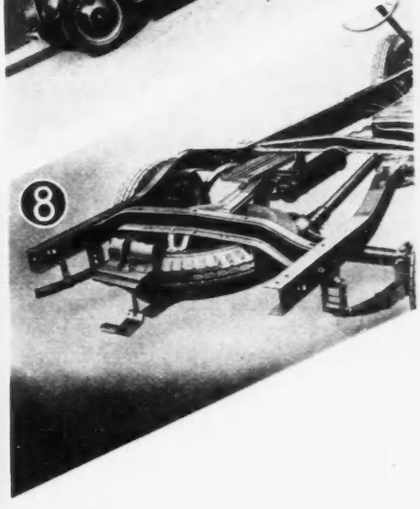
CHEVROLET announces its 1937 commercial cars and trucks, completely redesigned in chassis and bodies. All models have a new six-cylinder valve-in-head high-compression engine of increased horsepower, placed farther forward in the chassis to make room for longer bodies on the commercial cars, and improved load distribution on the 1½-ton models.

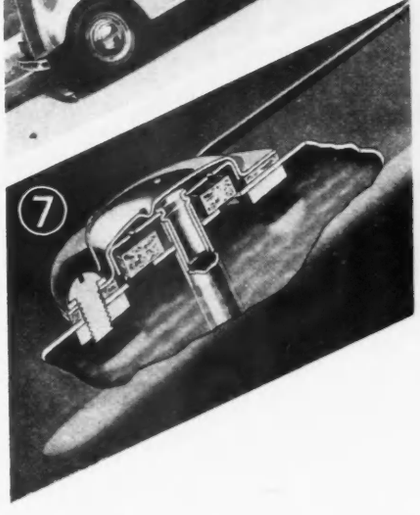
The new engine develops 78 hp. at 3200 r.p.m., an increase of 6 horsepower over the previous model. Torque is increased from 155 lb. ft. to 170, maintained at its maximum over a wider range of engine speeds, from 850 to 1550 r.p.m., corresponding to road speeds of two miles per hour in low gear to 27 miles per hour in high gear with the Chevrolet four-speed transmission. Full pulling power is thus available through the normal range of operating speeds of a heavily loaded truck.

These operating advantages are made possible through extensive redesign and improvement of the power plant. Piston displacement is increased to 216.5 cu. in., and the compression ratio is increased to 6.25. Although larger, the new pistons are both lighter and stronger, being of dome-head, slipper-type skirt construction, with X-rib reinforcement. The crankshaft and camshaft have four bearings each.

The intake manifold is redesigned to effect better heat control. The radiator grille has been redesigned to space the chromium bars farther apart, thus admitting more air to the radiator core. At the same time, the fan has been relocated to permit the blades to extend higher. This results in a much greater volume of air being pulled through the core. A permanently sealed, leakproof

REDESIGNS 1937 LINE





Illustratio-s are of (1) Chevrolet commercial panel body truck, 112-in. wheelbase; (2) 1½-ton stake, 131½-in.; (3) New sedan delivery; (4) Commercial canopy express, 112-in.; (5) Chevrolet's new open express job; (6) 1½-ton canopy express on 131½-in. wheelbase; (7) Outside gas tank vent keeps fumes from entering the cab; (8) The tire carrier is mounted under the frame and provides greater security against theft

water pump is used, and the radiator filler cap is now under the hood on the curb side of the top of the tank. A cooling system thermostat has been added, to effect greater speed of warm-up in cold weather.

ON both the commercial car and the 1½-ton truck models, the cab and the panel bodies are of all-steel construction, including seamless, one-piece tops. The load platform is constructed of wood. Cabs and bodies are more streamlined and have some of the distinctive features in the Chevrolet 1937 passenger cars. The hood top extends forward to the new radiator grille. Full-crown fenders run into newly patterned running boards. Headlights are long and tapering.

The wheelbase of commercial car models remains at 112 in., but the forward position of the engine permits the addition of close to 12 in. to the load floor length of panel and express bodies, while increased rear tread makes possible an increase of 2⅞ in. in load width. In the 1½-ton models the change in engine location is utilized to move the load center farther ahead of the rear axle, effecting improved weight and load distribution. The 1½-ton models are in two wheelbases, 131½ in. and 157 in.

Both the commercial cars and the 1½-ton trucks have chassis frames of improved design, and are stronger. The engine rear support now serves as a frame cross-member. The commercial car frame is longer, with cross-members of flanged U-section and box section construction. Attachments are of the "Alligator Jaw" type, making a more rigid attachment to the frame. The

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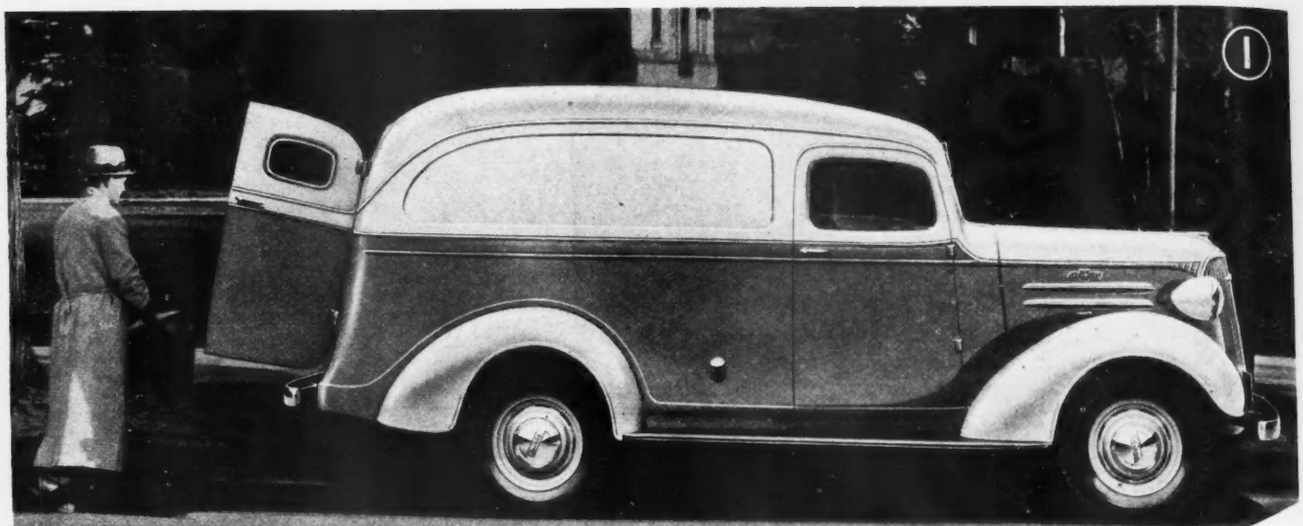

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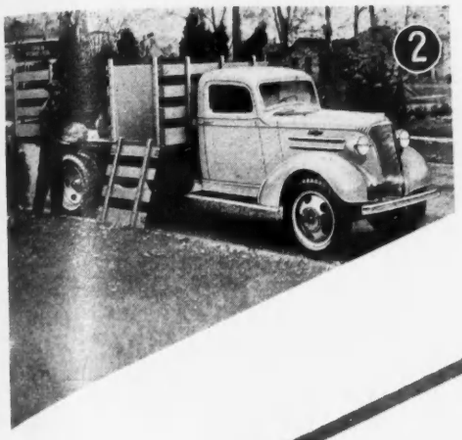
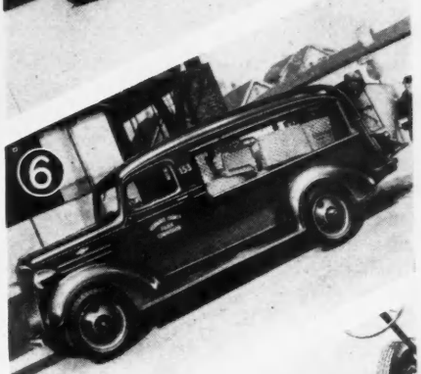
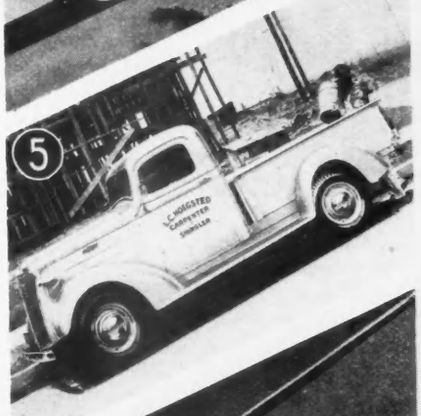
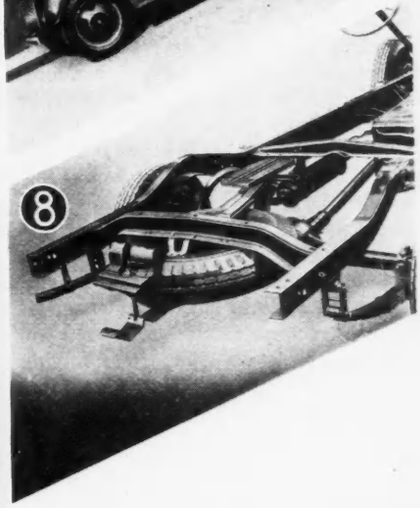
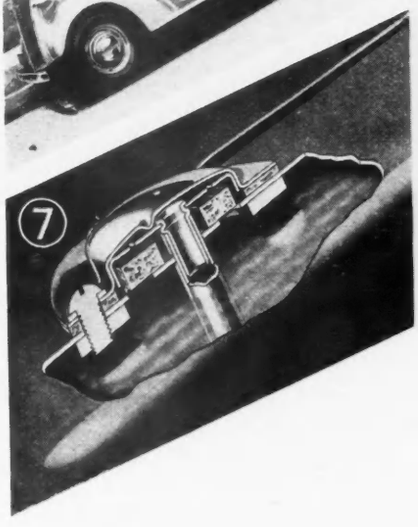


REDESIGNS 1937 LINE









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Federal

1937 THEME HAS 99 VARIATIONS

New Series of Conventional Trucks from 1½ to 4½-Ton Capacity Raise 1937 Line to 18 Models With 99 Optional Wheelbase Lengths; Front-End Restyling is Smart

IN addition to the group of new cab-over-engine models recently announced, the Federal Motor Truck Co. now presents a new series of conventional trucks for 1937 as follows: model 15, 1½-2½ tons; model 18, 2-3 tons; model 20, 2-3½ tons; model 25, 2½-4 tons, and model 29, 3-4½ tons. The expanded Federal line for this year includes eighteen separate and distinct models from ¾ to 7½-ton capacity on which a total of 99 different optional wheelbase lengths are offered, the largest line, it is said, ever produced by this company.

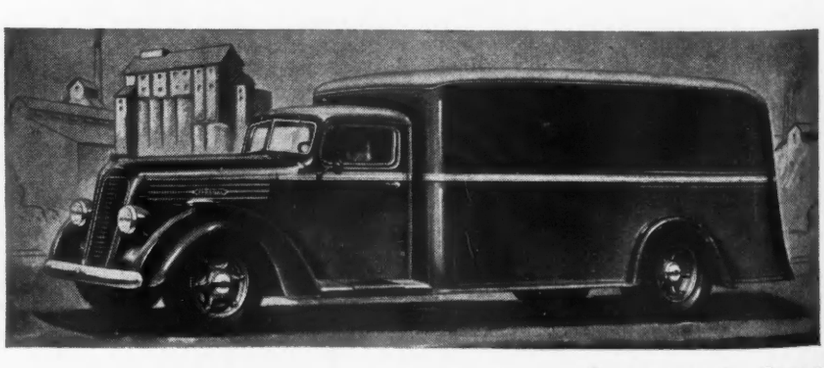
The new Federal conventional models just brought out have been completely restyled, but there are no major changes in mechanical construction. In designing these new 1937 models Federal has gone to great lengths to provide modern streamline style to meet the demand of today's truck purchasers who rate appearance as a very important buying factor.

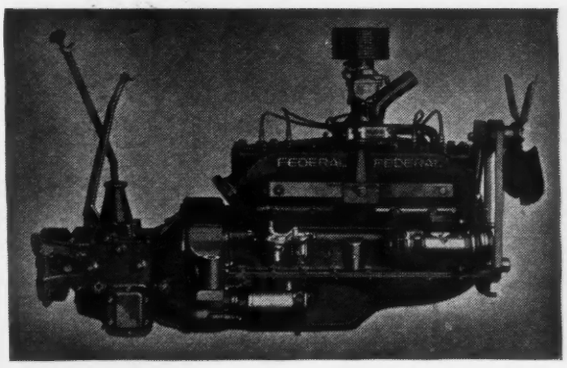
The engine and dash have been moved forward. The radiator shell, tastefully ornamented with stainless steel molding, is set at a rakish angle and fitted with a rounded grill. A chrome-plated pennant ornament is mounted on top of the radiator shell, the filler cap being placed under the hood. Louvres are mounted with three parallel stainless steel moldings into the center of which the name plate is fitted.

FENDERS are deep crown skirted type. Running boards are lower than formerly and have deep rounded edges and are equipped with rubber mats. The bumper is of spring steel. Large chrome-plated hub caps are standard equipment. De luxe features which contribute to further attractiveness are available as extras. Included are chrome-plated bumper, bumper guards, headlamps and fender parking lights.

Two new Federal-built cabs are offered for these models with the combined advantages of more roominess, greater comfort and better insulation throughout. The standard cab has a one-piece sloping windshield, while the de luxe has a V-type sloping windshield with dual windshield wipers. Both cabs have one-piece steel roofs which are lined with steel with insulating material between the two sections. In fact, a great deal of attention has been paid to insulation in the two Federal-built cabs with the result that both cabs are thoroughly sealed against heat and cold. For example, clutch and brake pedals are fitted with rubber pads covering the floor slots. The dash is sealed by ½-in. insulated material while the underside of the seat is completely sealed by insulation against cold or gas fumes.

Both cabs are 5 in. wider and 3 in. longer, providing more leg room and comfortably seating three men. The present dimensions of both cabs are: 50½ in. high, 29 in. long and 60 in. wide. Other features include drop skirt to the running board, chrome-plated





Left: Smart restyling of Federal's front-end features radiator shell ornament with stainless steel molding fitted with a rounded grille. Above—70 hp. Hercules engine which powers the new Federal Model 15. Opposite page: Federal-built de luxe cab and skirted box-type panel body.

windshield frame, felt-insulated rubber floor mat and easy-operating window regulators. There is a large pocket under the right side of the instrument panel for delivery records. Seats are deeper and more comfortable. The seats and back are of high-grade spring construction padded with hair and covered with durable textile leather. Interior finish of both cabs is cream color. The standard cowl has a top ventilator and side ventilator giving three-way ventilation can be supplied if desired.

By moving the power plant and the dash forward 4 in., better load distribution is obtained. This has also made possible the mounting of the larger cabs without sacrificing payload space, and, in addition, a slight reduction in wheelbase length is obtained.

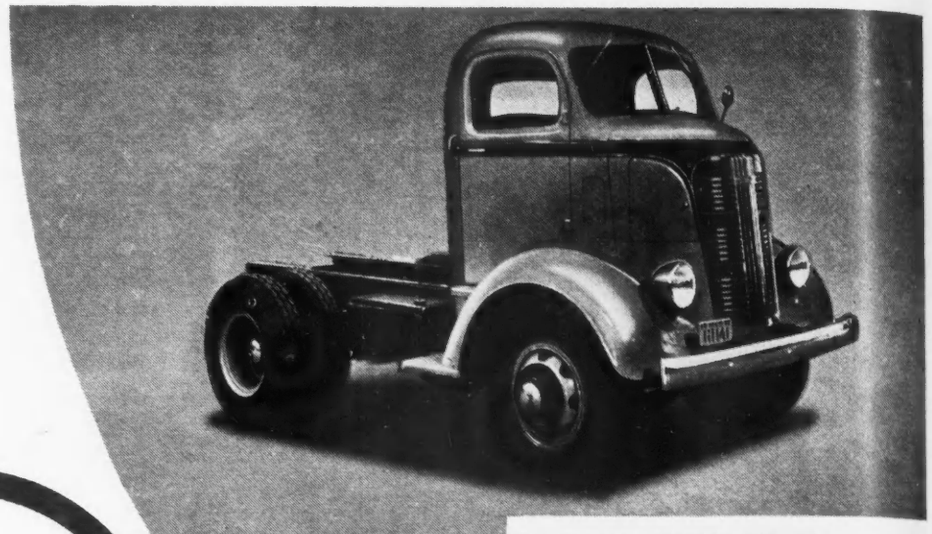
A wide choice of wheelbase lengths to fit individual transportation requirements are furnished on these models. The following wheelbases are available: Model 15: 135, 146, 155 and 167 in.; model 18: 135, 146, 155, 167 and 180 in.; model 20: 135, 146, 155, 167 and 180 in.; model 25: 135, 146, 155, 167, 180 and 194 in.; model 29: 135, 146, 155, 167, 180 and 194 in.

Federal continues the use of the Hercules six-cylinder truck engines in this group of new models. Model 15 is equipped with a JXA engine, 3⅜-in. bore by 4¼-in. stroke, 228 cu. in. displacement. Models 18 and 20 are powered with the JXB engine of 3⅝-in. bore by 4¼-in. stroke, 263 cu. in. displacement. Model 25 has the JXC engine, 3¾-in. bore by 4¼-in. stroke, 282 cu. in. displacement. Model 29 has JXD engine, 4-in. bore by 4¼-in. stroke, 320 cu. in. displacement.

FEATURES common to all of these engines include a 2½-in. 7-bearing crankshaft, large full-length water jackets, positive gear-driven water pump, force-feed lubrication, valve seat inserts, silent wide-face timing gears, down-draft carburetion, air cleaner, oil filter and governor. An oil bath air cleaner is standard equipment on models 20 and 25 and 29.

Rear axles on all of these new models are Timken full floating bevel drive type. Two-speed axles are available in all of these new models as special equipment. Other important general specifications include 8½-in. fish belly type frames, 4-speed transmission on 15, 18, 20 and 25 and 5-speed on 29, roller-bearing universal joints, large four-wheel hydraulic brakes, cast steel wheels, fore-shackled front springs and rubber-bushed spring eyes that require no lubrication. A vacuum power booster is standard equipment on the 20, 25 and 29 models. A five-speed transmission is available as special equipment on the models 15, 18, 20 and 25.

Prices at the factory of standard wheelbase chassis with standard equipment are as follows: Model 15, 1½-2½-ton, with single rear tires, $695; model 18, 2-3-ton, dual rears, $925; model 20, 2-3½-ton, dual rears, $1,075; model 25, 2½-4-ton, dual rears, $1,295; model 29, 3-4½-ton, dual rears, $1,745.



1937 Line Has New Looks and Full Range of COE's

New 112-in. ½-Ton Model With Base Price of $395 and New "230" Engine Make Bow; 2-Tone Color Combination Puts Accent on Appearance

WITH the introduction of a new 112-in. chassis to supplement the ½-ton Model T-14 line which was first groomed last year, General Motors Truck and Coach cuts deeply into the lowest price class in its whole history with a base price of $395.

However, the biggest news from GMC of Pontiac, Mich., is the availability of a complete line of trucks and trailers designed to meet the needs of any operation, led off by a complete series of cab-over-engine models, designated as the F-series COE.

The vehicles in every series feature a fresh and distinctive styling in a two-tone color finish which is carried out as the theme of eye-appeal on every job and expresses the essence of utility, strength, and massiveness that denotes the heavy-load carrying vehicle.

For 1937, GMC provides a variety of standard equipment features, mechanical options, and de luxe packages which is expected to meet the special needs of the truck buyer. Naturally, the mechanical features carry a number of important detail improvements both in running gear and power plants. But of mechanical features, easily the most important news is the introduction of a new engine—the "230," which now replaces the "213" on the light series.

One of the most attractive features to be found in a line of heavy-duty trucks is the availability of a group of 12 dual-tone color combinations at no extra cost.

The new line leads off with the

Illustrations show (1) styling of the new GMC cab-over-engine truck; (2) Interior of the COE cab. Note position of hand brake and gear lever; (3) New 112-in. ½-ton model has base price of $395; (4) Showing roominess of the ½-ton model cab; (5) Packless type water pump on models 239, 257 and 286 and Models T-18 to T-33H inclusive; (6) 1½ to 2-ton stake is priced at $525 F.O.B.; (7) new ½-ton, 112-in. panel body job features large loading space; (8) Showing method of mounting core and shell independently of each other; (9) Tilted engine permits easy servicing.

½-ton T-14 having two wheelbase options, 112 in. and 126 in., the 112-in. job bearing a base price of $395. The group of three lowest price jobs—T-14, T-16, and T-16H—all use the new "230" engine.

Models T-18 and T-18H have the "239" engine; T-23 and T-23H have the "257" engine; T-33 and T-33H have the "286" engine; and T-46 has the "331" engine standard and the "400" engine optional when purchased with a special heavy-duty group.

Models T-61 and T-61H both are fitted with the "400" engine standard and offer the "450" engine as an option.

Paralleling the conventional line starting with the model corresponding to the T-16 is a complete line of cab-over-engine jobs bearing the model designation of F-series. Thus the F-16 corresponds to the T-16 as to mechanical specifications. The F-18H corresponds to the T-18H, etc. The engine for each of the F-series is the same, including heavy-duty options, as for the corresponding T-series. The straight rating for each of the F-series runs higher than for the corresponding model in the T-series, due to the increased weight distribution on the front end.

As last year, the "H" series indicate companion models having the same chassis features but using the rear end assembly of axle, springs, etc., of the next largest model, thus increasing load-carrying capacity.

COMING to the new cab-over-engine series with their distinctive eye-appeal and dual-tone color scheme, we find

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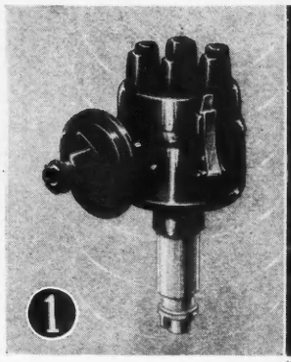
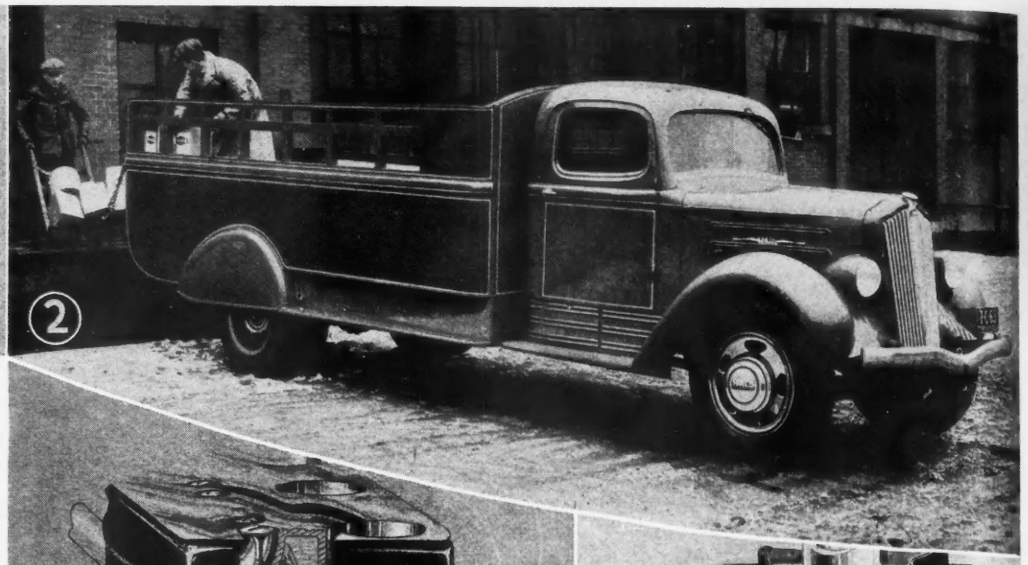
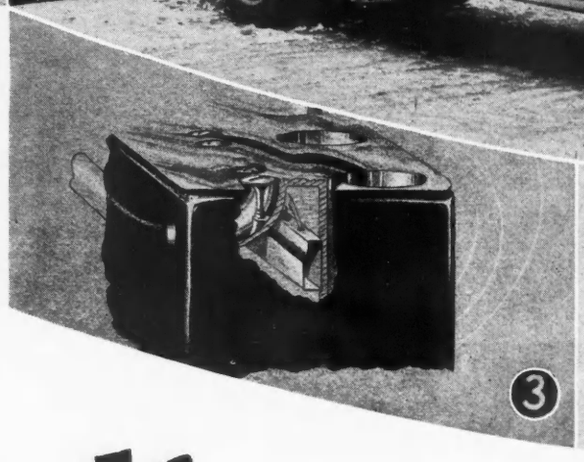
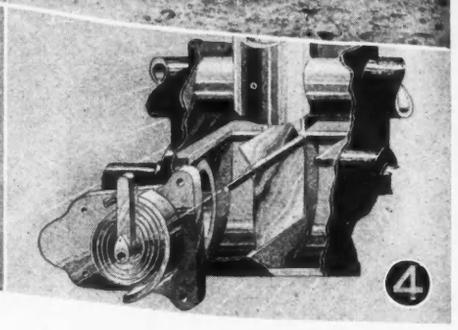








White

Illustrations are: (1) A vacuum controlled distributor in the new White 250 cu. in. engine insures proper position of spark at all speeds; (2) Model 700 de luxe stake body featuring style and utility ranges in wheelbase from 136 to 196 in. (3) Showing the directional water cooling system to exhaust valve seats in the new engine. (4) Thermostatically-controlled hot spot in the exhaust manifold insures full vaporization of fuel

Lists 1 to 1½-Ton at $985

Models 700 Truck and 700K Tractor Are Lowest Priced in White's History, Featuring 6-Cylinder 250 cu. in. Engine and Many Refinements

THE lowest-priced White truck ever to be placed on the market, will be listed at $985 and up, rated in the 1-1½ ton field, and will be turned out in two models—Model 700 and 700K tractor. Embodying well-balanced mechanical specifications, the new series will make available a group of optional features such as wheelbases, transmissions, rear axle ratios and tire sizes, to meet the requirements of specific operations.

The outstanding single feature of the new 700 series will be a new White six-cylinder engine of 250 cu. in. displacement, having light-weight deluxe pistons and an exclusive water cooling system for the valve seats.

The latter system provides a constant flow of cooling water against that portion of the cylinder block surrounding the exhaust valve seats, thus eliminating the threat of block warpage and valve pitting, while insuring long life at this point.

In addition, the new motor is equipped with a heavy seven-bearing counterweighted crankshaft mounted with a vibration dampner which, along with an improved four-point rubber engine mounting, makes possible the free, smooth, vibrationless action so essential to present day engine operation. Indicative of the ruggedness of this crankshaft is its weight of 97 lb. mounted on seven main bearings having a projected area of 30.7 sq. in. In the new engine, excessive wear on piston pins and bushings is prevented by rifle-drilled connecting rods which allow full-pressure lubrication to these vital points.

To guarantee economical operation, the engine is equipped with a vacuum-controlled distributor which permits proper spark advance for every load and speed condition and thereby insures a considerable saving in fuel consumption. An inlet manifold of the

(TURN TO PAGE 76, PLEASE)

Studebaker

STYLES HALF-TON LINE SMARTLY

A NEW type "Coupe-Express" of half-ton capacity is announced by the Studebaker Corp. This new vehicle, which will be on display in January in dealers' showrooms in major markets, combines full passenger car comfort with half-ton load capacity and streamline styling. The F.O.B. factory price for chassis, coupe cab and body is $595 list; for chassis and coupe cab only, $570 list.

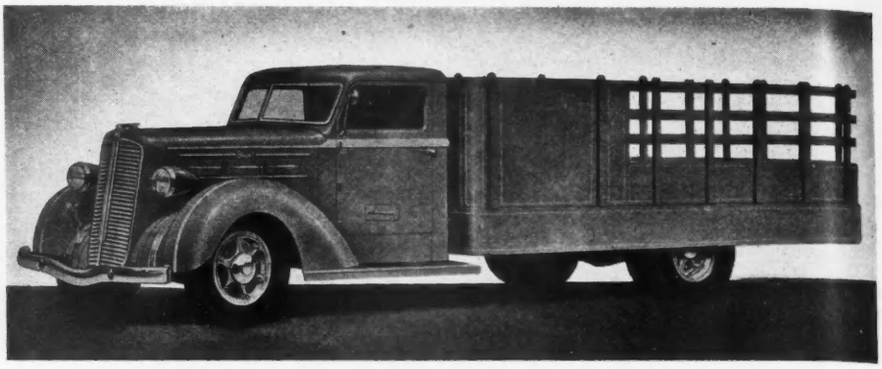
This vehicle is offered in four different types: The coupe-express, metal cover express, suburban car, and chassis with cab. All bodies are smartly streamlined and of practically the same styling.

Features begin with an all-steel cab and body, and the automatic hill-holder, a fool-proof device which prevents the truck from rolling back down a hill after it has come to a full stop. Other safety features include hydraulic brakes, automatic non-stall idling, and dual-range steering which halves the effort in parking, turning short corners, and crowded streets. The emergency hand brake is connected mechanically to the two rear wheel brake shoes. Another feature is the exclusive rotary door lock. The same anti-vapor lock system features in Studebaker passenger cars is also included in this unit. No longer is it necessary to change oil every 500 to 1000 miles. The installation of the Fram oil and motor cleaner makes it necessary to change oil only for winter or summer driving.

Built entirely of 16-gage steel, this open express body has an inner and

(Turn to Page 111, Please)

Illustrations are: (1) Rear view showing loading space of the Studebaker open coupe express. Note reenforcement of floor. (2) Side view of this job. Note flare design of tail gate. (3) Interior of cab showing parking brake on left and neat instrument panel. (4) Roomy 6-passenger suburban car has plenty of luggage space



Stewart

"A" Series Trucks Feature Style, Comfort and Economy

IN its new "A" series just announced the Stewart Motor Corp., Buffalo, N. Y., presents an unusual line of trucks which combines smartness and beauty with practical utility. The models in the A series are the 45A, 1½ to 2-ton capacity; 50A, 2½ to 3½-ton capacity; 47A, 2 to 3-ton capacity, and the 49A, 3 to 4-ton capacity. Two models are equipped with two-speed rear axles and they are known as the 45AS and the 50AS.

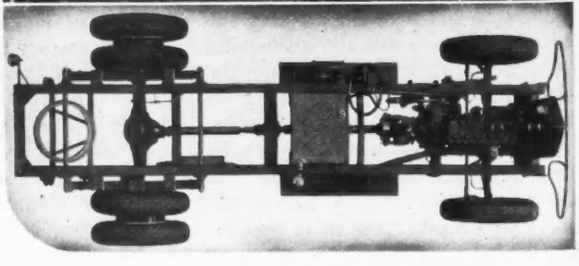
The 45A is powered with a 3⅜-in. by 4⅛-in. Waukesha engine having 222 cu. in. displacement. This engine develops 155 lb. ft. of torque and 65 hp. at 2800 r.p.m. The 50A has a 3⅝-in. by 4¼-in. Waukesha engine of 263 cu. in. of piston displacement. The torque is 175 lb. ft. and the horsepower is 77 at 2800 r.p.m.

THE 47A incorporates a 3½-in. by 4¼-in. engine of the same make having 165 lb. ft. of torque and 70 hp. at 2800 r.p.m., while the 49A has a 3¾-in. by 4¼-in. engine of 282 cu. in. piston displacement giving 190 lb. ft. of torque and 83 hp. at 2800 r.p.m.

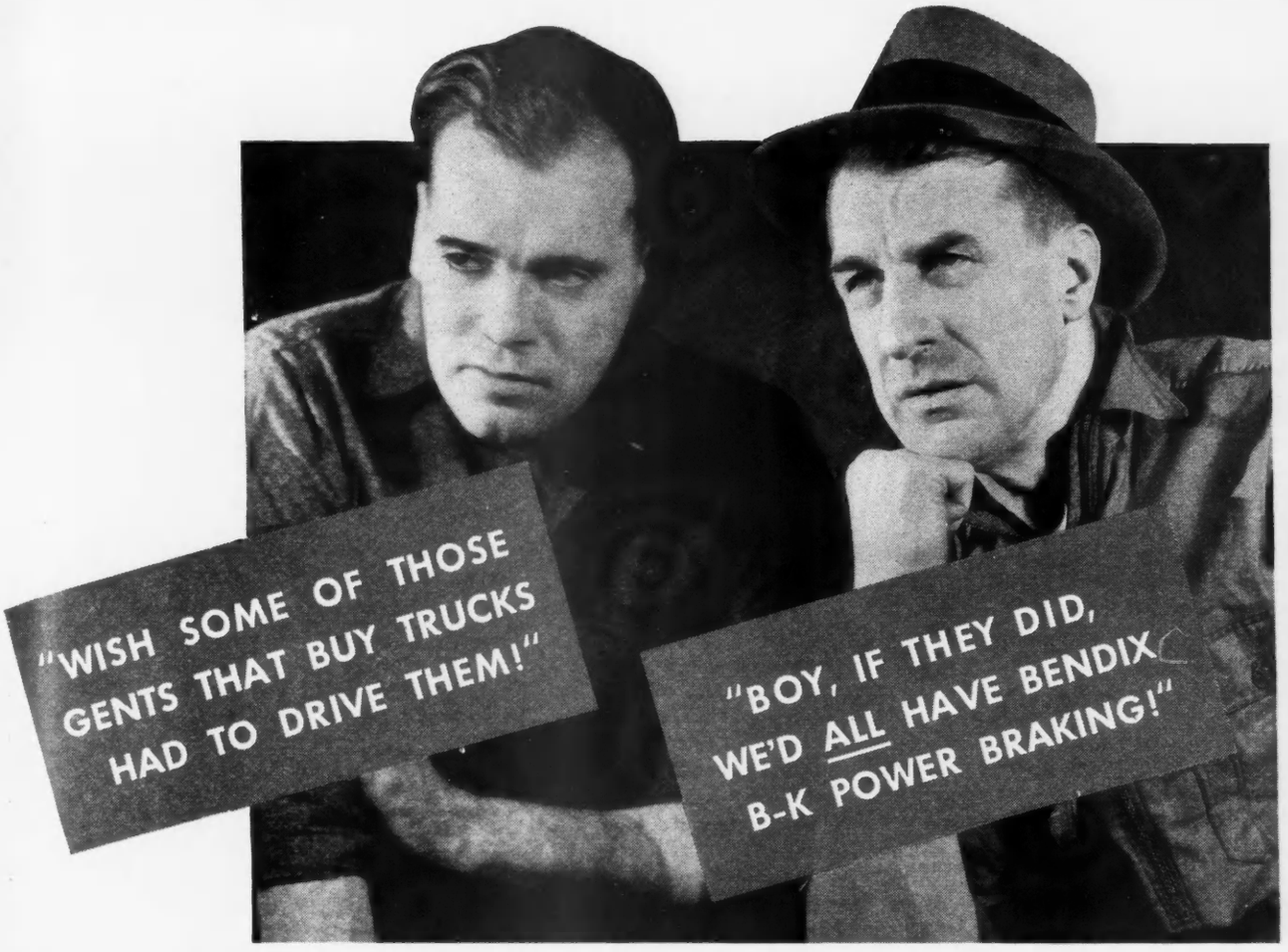
Size 6.00/20 tires with duals rear are standard on the 45A, and the 47A and 50A use 6.50/20 tires. The 49A has 7.00/20 tires. All have duals in the rear and all have hydraulic brakes.

Good visibility is an added feature. Broad Vee-type windshields, narrow pillar posts and large door glasses give the driver a clear view. The cab, which is of the coupe type, provides ample room for three men to ride in comfort. New fender lines and radiator grille add to the appearance and the fenders are so curved that there is easy access to all engine parts. Front axles have been relocated for better load distribution, which with the perfected geometry of the whole steering mechanism makes for easier handling in city traffic.

THERE has been no sacrifice of accessibility or of practical advantages for the sake of extreme styling or good looks. Indicating instruments have been grouped in a convenient location. Special adjustable ventilators in cowl and doors keep the cab provided with a constant flow of fresh air. Small drivers' conveniences such as glove compartments and cigar lighters are in evidence. The recessed gasoline tank filler located just outside the door is in a closed compartment.



Top—Model 45-A Stewart, smartly styled and typical of the new "A" series trucks. Center—Interior of the cab features roominess. Bottom—The chassis is built for strength and durability



The *HIGH-UPS* don't always get the *LOW-DOWN!*

IT isn't babying a driver to put Bendix B-K Power Braking on his truck. The point is, this long-proved equipment does a lot more than merely save muscle-effort.

Bendix B-K Power Braking saves *trucks*, saves time—saves merchandise and saves life. One ordinarily-serious accident can cost more than Bendix B-K equipment for a good, big, truck fleet.

Why pass up such low-cost precaution? Why put the whole worry of keeping out of trouble up to the drivers? Maybe they'll never complain about it, but silent resentment can be expensive too!

Power Braking is sensible! It's money-saving! It's been proved for many years on hundreds of thousands of vehicles. Bendix B-K Power Braking, the most advanced type known, is the choice of the overwhelming majority of operators. Some of the reasons are listed here. There are others. Write for them, and for the surprisingly low cost figures.

BENDIX PRODUCTS CORPORATION
(Subsidiary of Bendix Aviation Corporation)
401 Bendix Drive South Bend, Indiana

WHY MOST POWER BRAKES ARE BENDIX

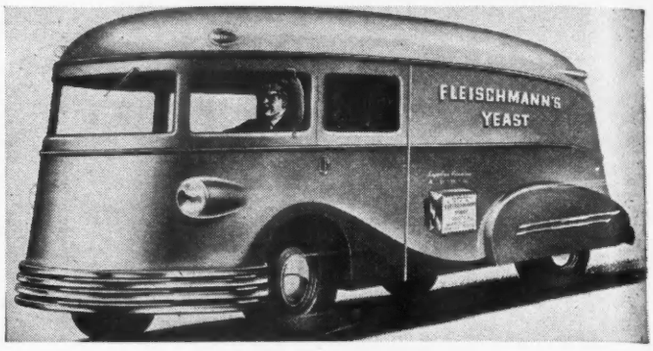
- ★ Least Weight Added
- ★ Fewest Added Parts
- ★ Low First Cost
- ★ Practically No Maintenance
- ★ Instant Remote Control
- ★ All Emergency Features of Train Operation
- ★ Quickly Installed
- ★ Original Brake System Left Intact
- ★ Fully Controlled Power Application
- ★ A Nation-Wide Exchange Plan
- ★ A Nation-Wide Service Organization
- ★ Years of Power Braking Experience and Unapproached Protection Over Future Years of Service

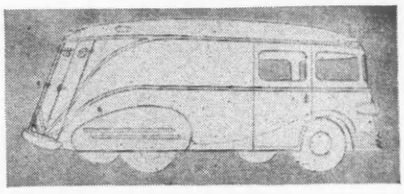
BENDIX

B-K VACUUM POWER BRAKING A BENDIX PRODUCT

Controlled Vacuum
POWER BRAKING

Luce's Merchandor is Special Delivery Job





Above: Mastercraft body designed by Luce for cab-over-engine type chassis of light and medium capacities. Left: Rear view of the "Merchandor" showing streamlining and full length doors.

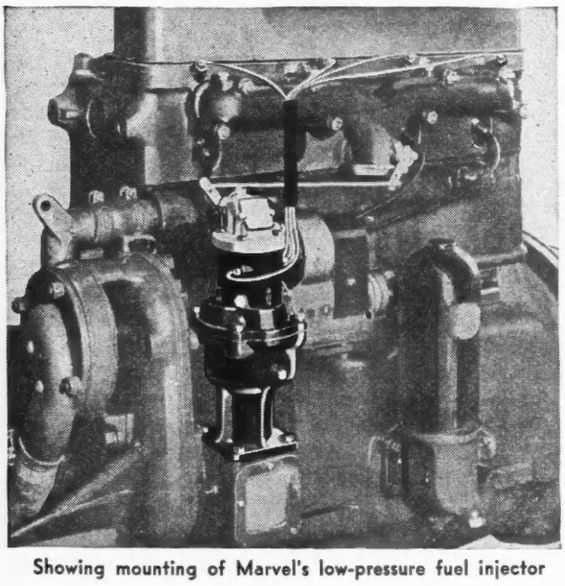
A NOTABLE addition to the famous Mastercraft line of truck bodies built by Luce Manufacturing Co., of Lansing, Mich., is a cab-over engine type for use on all chassis of light and medium capacities. It is known as *The Merchandor*, since its field of use lies particularly in retail and wholesale merchandise delivery.

In designing the Merchandor, Luce engineers abandoned all precedents and started out with a fresh viewpoint. The hood and cowl have given way to a cab that is integral with the body, affording perfect vision and protection from the elements. Streamlining has been given careful thought and, considering the shortened wheelbase which jobs of this kind require, an effect of generous length has been incorporated in the design. By utilizing a portion of the over-engine space for operator seat and controls and widening the body flush with wheels, load space has profited both in width and length.

In operation, the Merchandor body retains the Mastercraft retail delivery's exclusive one-step entrance. Doors on either side operate by easy sliding action toward the rear, where they may be locked in open position if desired. When doors are closed, body sides are flush and steps are protected from the weather.

While overall dimensions of Merchandor are larger than bodies of conventional type, costs are not greatly increased since many important chassis items, such as fenders, radiator shell and other major parts are eliminated.

Luce builds this type of body for use on chassis sizes from ½-ton to 2 tons, inclusive, a range that covers the greatest part of the baking industry, all distributors of tea, yeast, cigarettes, etc.; grocers, drygoods stores, confectioners, caterers, florists, dry cleaners, and a host of merchandisers in similar lines.



Showing mounting of Marvel's low-pressure fuel injector

Marvel Has Injector for All Grade Fuels

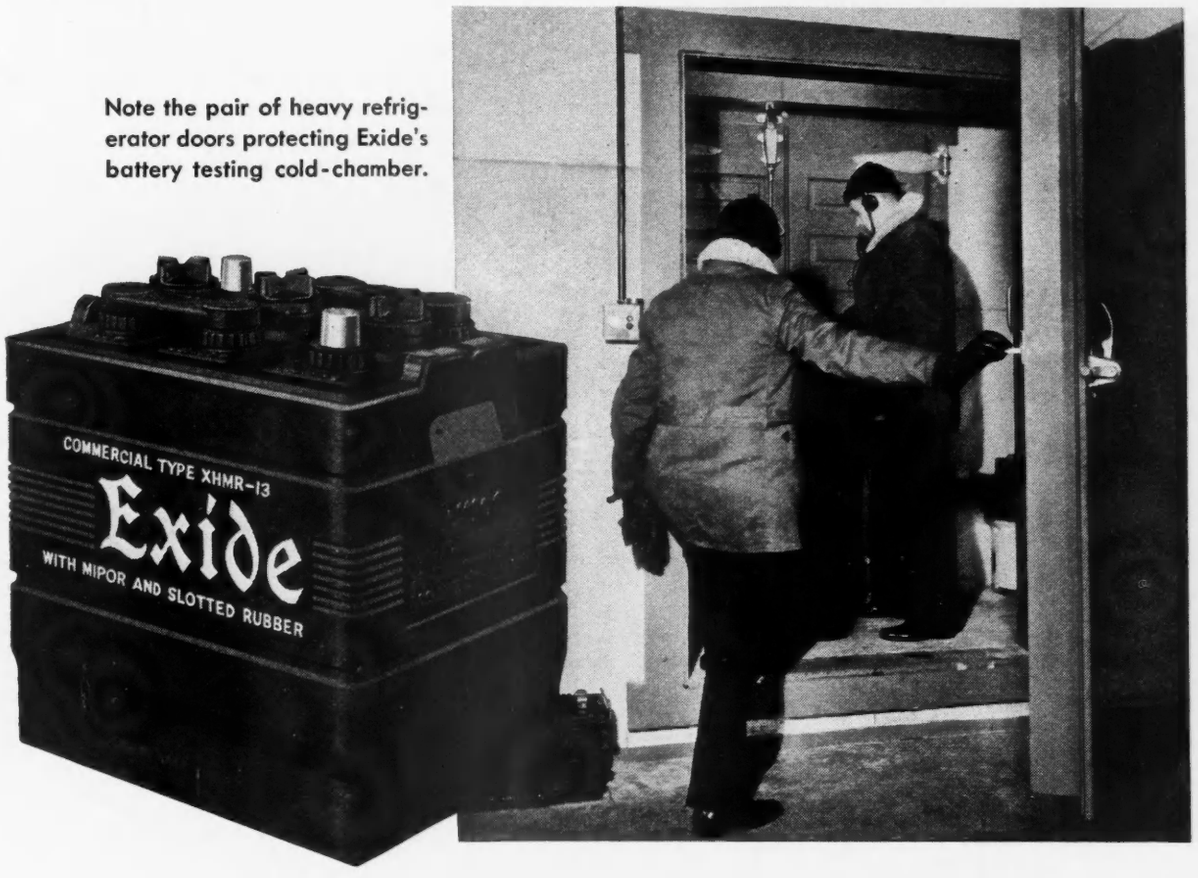
A LOW-PRESSURE fuel-injection system now in production by the Marvel-Schebler Carburetor Division of Borg Warner Corp., Flint, Mich., is designed to handle fuels ranging from gasoline to the heavier furnace oils. It was developed for intake-port injection in spark-ignition engines and is claimed to be self-compensating for load variations. Marvel has also developed a high-pressure injection system for diesels.

The system may be used for injecting gasoline only, fuel oil only, or both fuels in the same engine. When used to inject gasoline only, the atomizing nozzles are located in the intake ports, the spray being directed either with or against the air stream. The duration of injection is substantially equal to the period of induction. It is not necessary to preheat the air, as the heat necessary for the vaporization of the fuel is drawn from the port walls, the intake valve, and the residual gas from the previous cycle. The resulting refrigerating effect assures a higher volumetric efficiency, and it is claimed that the uniformity of the charges delivered to individual cylinders permits of the use of higher compression ratios and thus adds to the engine output.

WHEN heavier fuels are injected, some heat must be supplied to the finely atomized spray. This is accomplished by providing a combustion-heated intake valve, or, alternately, by increasing the combustion-chamber temperature on the valve side. Where an engine is designed to operate on a variety of fuels from gasoline to furnace oil, the compression ratio is limited by the detonating tendency of the fuel of lowest octane rating. On the other hand, if the engine is designed to operate on gasoline only, the compression ratio can be increased and the output stepped up.

EXIDES FOR COMMERCIAL VEHICLES

Note the pair of heavy refrigerator doors protecting Exide's battery testing cold-chamber.



These batteries pass the "Cold Chamber Test" . . . . at temperatures far below zero!

THERE'S a story behind the development of Exide's new line of Commercial Batteries—a story that gives just a little side light on the problems of creating a new product.

In the first place, fleet operators themselves contributed in no small way to the development of these batteries. From their letters and comments, we gained an accurate idea of what they would consider an ideal battery.

The men in the Exide Field Organization had their say on the service and maintenance angle. The Exide Engineering Staff went to work with a full understanding of the actual problems of users. And when Exide's technical and manufacturing facilities are applied to a problem as clear as that—you get results.

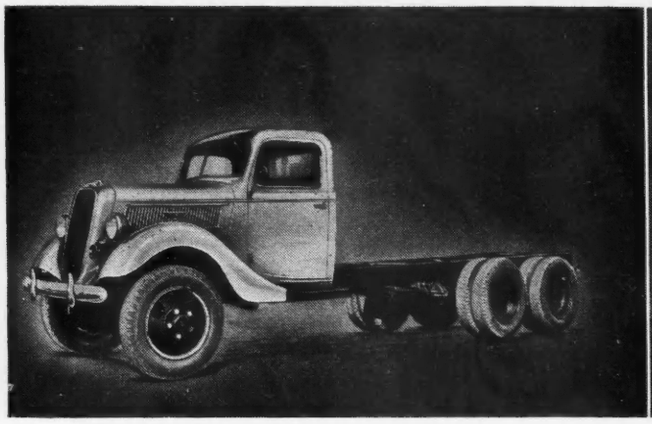
The batteries were designed and built, then tested—overloaded, abused and punished in Exide's special cold-chamber where both batteries and engines can be held far below zero indefinitely. When batteries come out of that endurance contest with flying colors, we know they're *right.*

That's what is behind this new line of Exides, and it's why you can use them with confidence, knowing that they'll deliver real service and save you money. Write us for the name of the nearest Exide Wholesaler, who will give you complete details on the four new Exide Commercial Type Batteries. For large trucks, there is the regular heavy-duty Exide line.

Exide

THE ELECTRIC STORAGE BATTERY CO.
Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

COMMERCIAL TYPE BATTERIES



Above, left—Marmon-Herrington's six-wheel drive Ford Model C5-6, 154-in. wheelbase. Above, right—All-wheel drive 112-in. V8.

M-H Front-Drives 1937 V8s

THE Marmon-Herrington Co., Inc., has adapted their four- and six-wheel drive features to the 1937 Ford trucks and will continue to make available Ford with a driving front-axle, two-speed auxiliary transmission and semi-elliptic front springs. The line includes four four-wheel drive models and two six-wheel drive models, all of which are offered in two tire sizes. The line has been further augmented by the addition of a four-wheel drive Ford on the 112-in. wheelbase light delivery or passenger car chassis. This unit has a driving front axle, truck clutch with four-speed transmission, transfer case and three-point suspension.

The driving front axle is Marmon-Herrington design and the auxiliary transmission in combination with the four-speed transmission gives a total of eight speeds forward, the high-speed range being exactly the same as the standard Ford range. Thus the normal road speed is available in addition to off the road traction. Prices of the Fords with Marmon-Herrington drive begin at $1,375.

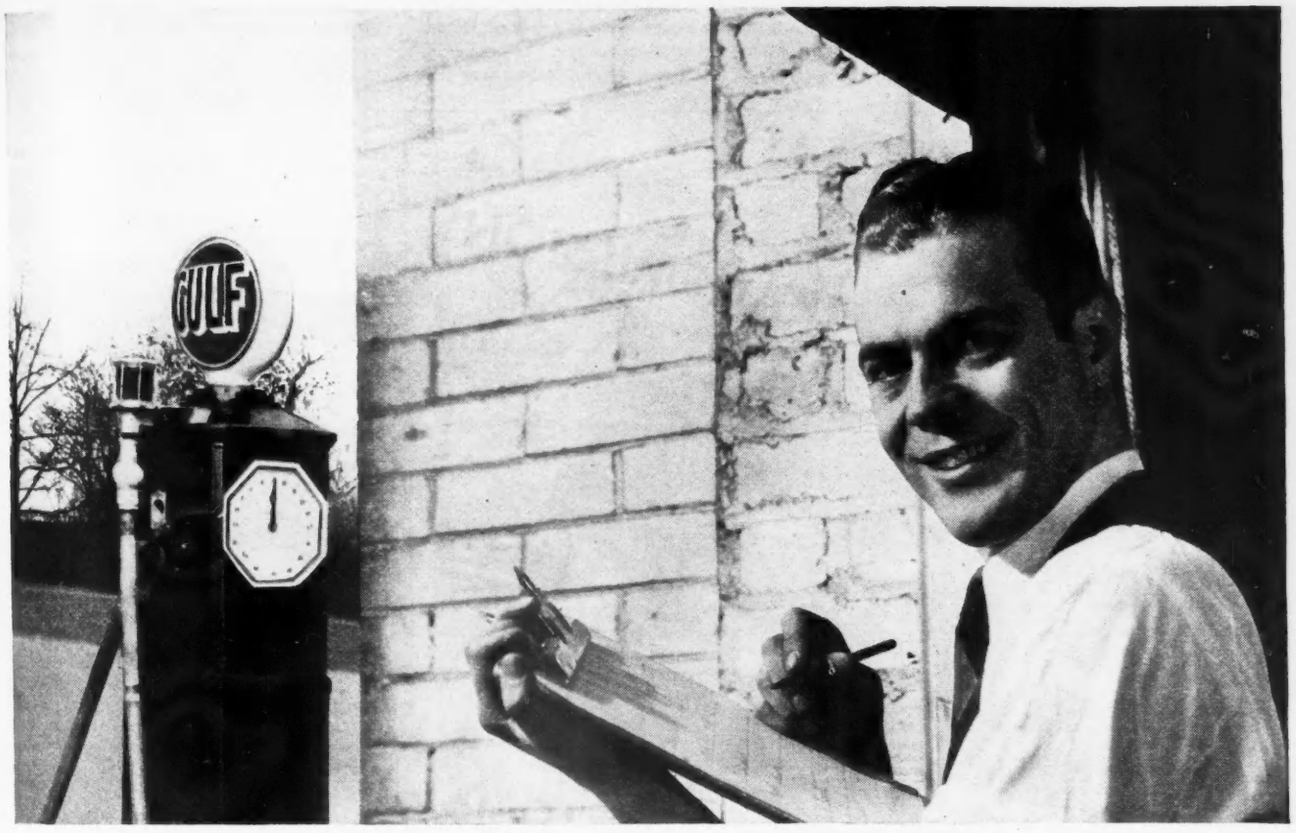
The "C" line of heavier four- and six-wheel trucks built by Marmon-Herrington are continued.

New Truck Registrations by Makes by Months

	Autocar	Brockway	Chevrolet	Diamond T	Dodge	Federal	Ford	G. M. C.	International	Mack	Reo	Sterling	Stewart	Studebaker	White-Indiana	Miscellaneous	Total
January.....1936	75	94	15,124	495	6,207	223	14,606	428	4,743	90	339	8	85	143	493	607	43,760
January.....1935	71	86	9,867	550	5,141	152	13,260	858	3,513	114	380	10	42	127	308	280	34,759
February.....1936	57	88	14,978	510	5,556	170	12,226	758	4,365	107	217	4	62	134	408	661	40,301
February.....1935	41	54	11,701	499	3,271	113	14,330	570	3,174	63	292	10	34	107	217	321	34,797
March.....1936	88	127	19,511	634	6,753	205	16,168	1,551	5,395	184	264	17	73	221	477	762	52,430
March.....1935	56	67	13,744	534	4,284	132	16,805	850	3,673	100	389	14	60	135	258	410	41,511
April.....1936	121	179	23,323	784	8,818	271	18,493	2,733	7,308	289	379	21	112	327	700	1,099	64,957
April.....1935	79	109	15,024	568	5,708	177	17,943	870	4,554	159	449	31	62	189	309	554	46,785
May.....1936	109	168	21,443	754	8,507	275	17,971	3,045	6,704	440	399	16	116	358	719	1,159	62,183
May.....1935	78	97	16,284	570	5,381	193	17,591	883	4,807	189	616	5	60	229	294	691	47,968
June.....1936	96	137	19,045	660	7,777	287	16,930	2,820	6,151	427	325	28	113	320	599	1,136	56,851
June.....1935	73	113	17,576	572	4,911	178	17,385	901	4,710	103	439	16	69	218	258	721	48,243
July.....1936	137	207	21,553	846	8,153	280	18,639	3,501	7,167	492	382	22	132	361	748	1,075	63,695
July.....1935	99	114	18,608	593	5,336	202	18,073	857	5,308	147	439	19	85	219	336	808	51,243
August.....1936	139	163	20,931	801	8,298	251	16,426	3,070	6,314	434	232	39	126	320	635	953	59,222
August.....1935	91	143	18,554	591	5,723	219	16,429	1,312	5,231	145	476	9	94	264	354	720	50,355
September....1936	124	138	15,589	826	7,957	244	17,044	3,209	6,640	424	521	17	141	327	645	765	54,611
September....1935	75	106	13,271	529	5,635	196	13,715	1,307	4,963	81	385	9	90	167	350	511	41,390
October.....1936	160	155	7,947	987	7,549	260	11,666	2,788	6,642	509	529	38	135	347	810	693	41,207
October.....1935	92	129	9,150	557	6,822	198	12,362	907	5,350	136	412	17	94	209	544	460	37,439
Ten Months..1936	1,106	1,456	179,444	7,297	75,567	2,466	160,169	23,903	61,429	3,396	3,677	210	1,095	2,858	6,234	8,910	539,217
Ten Months..1935	755	1,018	143,779	5,563	52,212	1,760	157,893	9,315	45,283	1,237	4,277	140	690	1,864	3,228	5,476	434,490
% Change 10 Mo..	+46	+43	+25	+31	+45	+41	+1	+157	+36	+175	−14	+50	+59	+54	+93	+63	+24

"DOES IT PAY

to use the world's finest motor oil?"



WE'LL grant you that, at first glance, the idea of using a premium-priced oil in your fleet may sound like carrying a good thing too far.

But that's because you don't know what THIS premium-priced oil can do.

For there is ample evidence to show that Gulfpride—the world's finest motor oil—not only costs no more to use, *but actually turns in a saving.*

Why? Because no other motor oil in the world is so free from waste . . . gives such superlative lubrication . . . or is consumed so *slowly.*

Give Gulfpride a six-month's trial in your fleet, and we believe your records will show that . . .

1.—*Despite its slightly higher initial cost, your oil bills have* dropped.

2.—*Your repair and maintenance expense has been drastically reduced.*

We can make these claims because Gulfpride is refined by Gulf's exclusive Alchlor process—the most advanced refining process known—the only one of its kind in the world.

Why not follow the lead of so many operators of large fleets—and give Gulfpride Oil a trial?

GULFPRIDE

THE WORLD'S FINEST MOTOR OIL

GULF

GULF OIL CORPORATION
GULF REFINING CO.,
PITTSBURGH, PA.

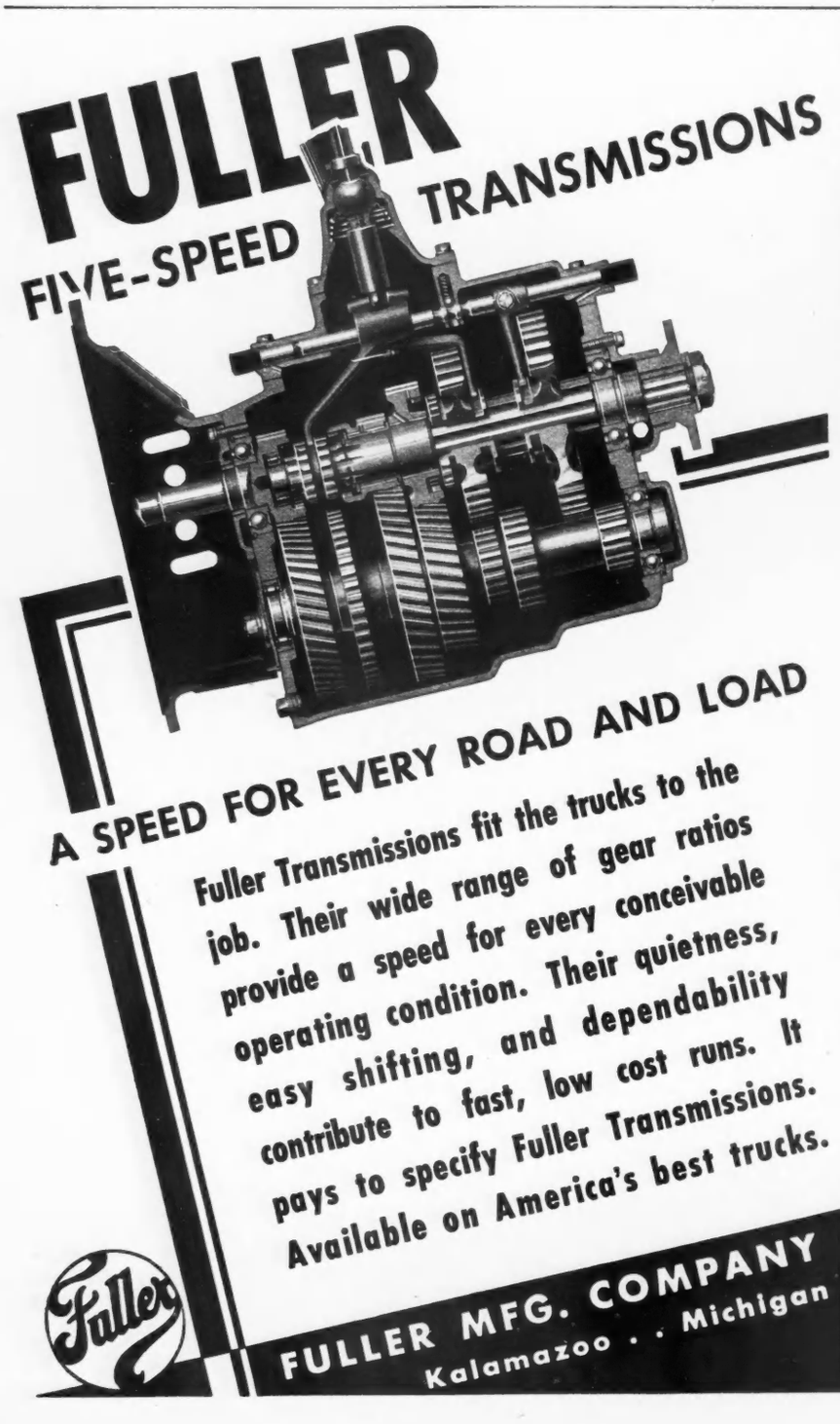
News · SUMMARY

Nine Hearings On Drivers' Hours

Hearings on maximum hours of service of employees of common and contract carriers of passengers and freight by motor vehicle are scheduled to begin in Washington, D. C., Jan. 11 before the ICC. Others will be held at Boston, Jan. 14; Atlanta, Jan. 18; Dallas, Jan. 21; Los Angeles, Jan. 26; Seattle, Feb. 1; Salt Lake City, Feb. 4; Chicago, Feb. 8; and Washington, D. C., again Feb. 15.

Ford Eliminates F.O.B. Prices

The Ford Motor Co. has adopted the policy of eliminating all "F.O.B." and "factory list" prices from Ford and Lincoln advertising effective throughout the United States. The new method of quoting prices will not change in any way delivered prices to the dealer or public. Any prices stated in factory advertising will be the delivered prices at Dearborn, Mich., without taxes.


FULLER
FIVE-SPEED TRANSMISSIONS
A SPEED FOR EVERY ROAD AND LOAD
Fuller Transmissions fit the trucks to the job. Their wide range of gear ratios provide a speed for every conceivable operating condition. Their quietness, easy shifting, and dependability contribute to fast, low cost runs. It pays to specify Fuller Transmissions. Available on America's best trucks.
Fuller
FULLER MFG. COMPANY
Kalamazoo . . Michigan

11-Month Sales Up 20%; Output Up 10%

New truck registrations for November, 1936, of 30,222 units were 27 per cent under October, 1936, when 41,207 units were sold. November, 1936, is also 18 per cent under November, 1935, when 36,935 units were registered.

Registrations for 11 months of 1936 were 569,439 units, a gain of 20 per cent over the same period in 1935 when 471,425 units were sold.

Production for November, 1936, totaled 54,160 units which is a 56 per cent increase over the 34,709 units sold in the preceding month of October. November production, however, represents a drop of 11 per cent under output of November, 1935, when 60,720 units were produced.

Truck production for the 11-month period of 1936 totaled 732,915 units. This is a 10 per cent increase over the same period in 1935 when 667,376 units were produced.

Adolf Gelpke (left) has been appointed chief engineer of the Autocar Company. He was formerly assistant engineer under B. B. Backman, vice-president of engineering. Ed. F. Coogan (right) has been upped to the position of sales manager of Autocar. He was previously assistant sales manager under H. M. Coale, vice-president in charge of sales

Ralph W. Enos has been appointed district manager of Wisconsin, Minnesota, North Dakota, South Dakota and part of Michigan, for Marmon - Herrington.

Lambert Co. To Handle Diesel

Arrangements have been completed between the Lon R. Smith Sales Co., West Coast distributor of Hercules diesel engines for replacements, and the Lambert Co., Ltd., for the latter company to handle diesels in the Southern California territory. The Lambert Co., Ltd., is an old established automotive house who is the distributor for truck replacement parts. The company will have on display in their showrooms, at 1202 East Olympic Boulevard, all sizes of the Hercules six-cylinder diesels.

[Additional News Page 55]

NEWS

(CONTINUED FROM PAGE 52)

Blanchard Joins SAE Staff

Donald Blanchard, formerly editor of *Automobile Trade Journal*, has joined the Society of Automotive Engineers headquarters' staff as secretary of the SAE Engineering Relations Committee.

Charged with supervision of all contacts between the SAE and outside agencies, this committee has been faced with demands for constantly increasing service ever since its organization more than a year ago. Particularly has the need become great for a more thorough continuing contact between automotive engineers and technicians of administrative and regulatory agencies to remove technical safety matters from the argumentative class by providing an uninterrupted supply of needed engineering facts. This task will be his major job.

ICC Issues Safety Rules

The I.C.C. has issued rules governing safety on the highways for interstate common and contract carriers under the Motor Carrier Act. These rules cover qualifications for drivers, basic rules for driving, requirements as to safety parts and accessories and rules for reporting accidents. The first three types of regulations will be effective July 1, 1937. The latter on April 1, 1937.

Shuler Opens Detroit Office

The Shuler Axle Co., Inc., Louisville, Ky., has opened offices at 7-151 General Motors Building, Detroit, Mich.

Timken Personnel Changes

The following changes in officers and directors of Timken Roller Bearing Co. have been made.

William E. Umstattd was elected president of the Timken Steel & Tube Co.

H. H. Timken, Jr., was made executive vice-president of the Timken Steel & Tube Co.

W. Robert Timken was elected director of the Timken Roller Bearing Co. and of the Timken Steel & Tube Co.

John E. Fick was appointed general superintendent of the steel and tube mills.

Retzlaff Upped

Walter G. Retzlaff has been named sales manager of the Fruehauf Trailer Co.'s wholesale division with headquarters at the Detroit plant.

Sherwin-Williams Color Service

Formation of an industrial and transportation color service has been completed by the Sherwin-Williams Co. It is under the direction of R. H. Hookway, company colorist. This new department offers designers and operators assistance in developing desired colors and combinations for "dressing up" new or old products, and gives information on types of finishes and their suitability for specific application requirements. After the color scheme is worked out, panels and paint-out tests are made on the material to be finished. These tests are made to assure the desired application qualities—durability, degree of gloss and color retention.

Chevrolet Opens Body Plant

What is believed to be the world's largest plant devoted exclusively to the manufacture of commercial bodies was formally opened by Chevrolet at Indianapolis Dec. 18. The plant will be capable of producing approximately 2000 bodies a day, officials estimated. It will manufacture, in all, 15 different body types supplying the full requirements of the company for commercial bodies for both domestic and foreign distribution. The plant contains nearly three miles of conveyors.

Wilkening Gets IHC Contract

Wilkening Mfg. Co. has been awarded a contract by International Harvester Co. of America, Inc., to supply Pedrick-Hydraulic piston rings for the next year for use as standard equipment in the 12-series and 40-series IHC engines used in the McCormick-Deering tractors. The company also reports that its piston ring installation is now used and sold by the service departments of White Motor Co. Indiana Motor Truck and Stewart Motor Corp. through their respective branches and dealer organizations.

MIDLAND EVERYWHERE!

A nation-wide network of Midland distributors is constantly available to serve operators using Midland Power Brake Equipment. This is just one of the reasons why there are so many Midland-equipped trucks and trailers—in every state of the Union and in the Dominion of Canada.

COMPLETE ENGINEERED KITS

Midland (Christensen) Kits, with full size cylinders, are complete—the choice of fleet operators who want full braking power with low operating costs. They are packed in handy packages for ***Ford, Dodge, Chevrolet, International, G.M.C.*** 1937 Kits now ready. Also Universal Hand Control Kits for any make or model.

See any one of more than 150 Midland sales and service depots for complete information, or write direct to factory.

- ★ ***Never cost more*** and generally ***less*** than other power brake equipment.
- ★ Conform to all state laws.
- ★ Serviced by a nation-wide organization of Midland Distributors.
- ★ Perfectly controlled stops with "Brake Feel."
- ★ Interchangeable in fleet operation.
- ★ Adapted to all types of vehicles.

MIDLAND STEEL PRODUCTS CO.

10605 Madison Ave. Cleveland, Ohio

Distributors Wanted: Write us about our distributor franchise. Your territory may be available.

MIDLAND (Christensen) Power Brakes

New Products ON PARADE

Valve Reseating Tool

THE Valvo Mfg. Co., Chicago, Ill., has a new valve reseating tool which will condition hard valve seats of any size or angle. The tool is driven by an electric drill. The stem of the valve taken from the engine is used as a pilot. The three grinding units of the reseater are held by three self-centering arms which make possible accurate work. See Fig. 1.

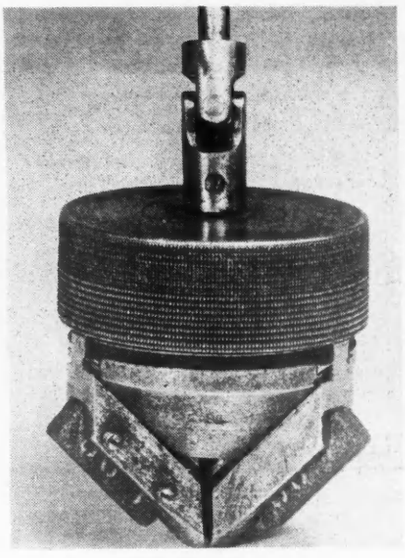


Fig. 1. Valve reseating tool

Retread Mold

CHARLES E. MILLER CORP., Anderson, Ind., has announced a new mud and snow retread mold which will take 32 x 6 tires and 6.00/21 tires. With three sizes of molds it is possible to apply this tread on 30 sizes of tires up to 7.00 size. The tread sign on the large-sized tires is 16/32 in. deep and requires a camelback 18/32 to 20/32 in. thick to retread with. See Fig. 2.

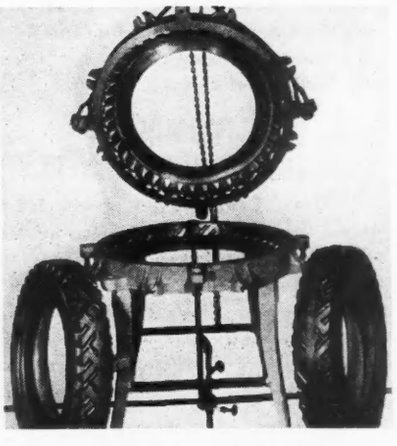


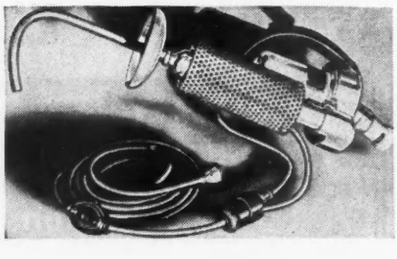
Fig. 2. Miller retread mold

Electric Heat Gun

A NEW electric heat gun combining an electric heater and vacuum cleaner is being introduced by the General Electric Co. Net price is $18, including all attachments for heating and cleaning.

The heater unit of the device attaches to the exhaust orifice of the vacuum cleaner and the combination provides a large volume of warm air for thawing out transmissions, differentials, carburetors, radiators, etc., and drying out ignition systems. The nozzle of the heater is curved to fit into the differential or transmission case. A bell-shaped shield prevents grease from dripping on the heater. With the curved heater nozzle removed, the gun can be used for thawing frozen radiators, etc. The heater uses a 660-watt element enclosed in a cast-aluminum housing. See Fig. 3.

Fig. 3. Electric heat gun



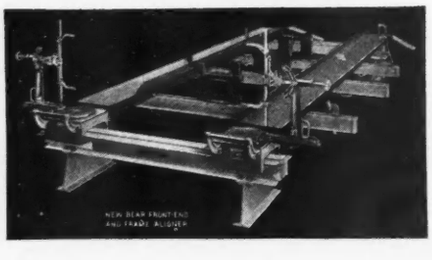
Front End Machine

THIS new Bear frame and front end machine combines in one unit the latest improved means for straightening frames without removal of bodies and testing and adjusting front-ends without disassembly.

The frame straightening mechanism includes all of the Bear features. A combination of automatic gages with indicator dials is employed for checking caster, camber, toe-in, king pin inclination and wheel trueness. Free floating and rotating turning gages measure the angle of left and right turns.

For further details write Bear Mfg. Co., Rock Island, Ill. See Fig. 4.

Fig. 4. Bear front-end machine



Permagrip Fastener

ERNEST SCHAEFER, 20627 Lorain Ave., Cleveland, Ohio, has developed "Permagrip," a new method of fastening wood, plywood, and other types of manufactured board to welded steel inner frame work in such a manner that the plywood or manufactured board becomes the strain bearing member besides forming a suitable backing for outer metal panels. The metal panels are folded over at the joint in such a manner as to relieve them of strains and permit them to react to weather conditions independently of the backing material. The Permagrip fastener is invisible and the outer panels are free from holes and rivet or bolt heads.

The fastener itself consists of a bolt with a slotted countersunk head under which is used a star-type lock washer with twisted fingers to give the spring. The nut is round and countersunk and the countersunk sides of the nut are grooved. To install the fastener, a special counterbore is necessary, and after the counterboring

[Other Products Page 58]

HOW FOOD HAULER CUTS TIRE COSTS!

NO TIRE DELAYS WITH NEW TRIPLE PROTECTED SILVERTOWNS

What a relief to eliminate tire delays! That's what the C. Rice Packing Company of Covington, Ky., did when they changed to Goodrich Triple Protected Silvertowns.

Their five big trucks are always on the go. Yet they haven't had a single delay with this new tire! Mileage has increased. Repair costs have dropped.

Wouldn't you like to cut down on delays? Put an end to sidewall breaks? Keep deliveries on time? Travel your trucks faster with safety? Hundreds of operators tell us they are getting just such results with Triple Protected Truck Tires.

It's easy to see why. Eighty per cent of premature failures occur in the sidewall —the "Failure Zone." And Goodrich gives you the only tire that has Triple Protection at that point! This new invention is designed to stop sidewall blow-outs before they start. It gets right at the root of truck tire troubles.

Costs No More

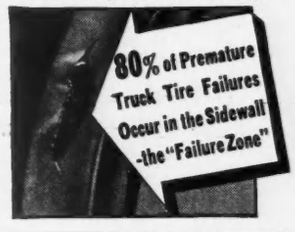
Every tire with Triple Protection costs more to build. It's an expensive development. But it does not cost you one thin dime extra. Goodrich Silvertowns are priced the same as other standard truck tires. Call the nearest Goodrich dealer. Ask him to tell you the whole money-saving story.

HOW TRIPLE PROTECTION WORKS

1 PLYFLEX—a new, tough, sturdy rubber material with greater resistance to stretch. A layer of Plyflex in the sidewall prevents ply separation—distributes stresses — checks local weakness.

2 PLY-LOCK—the new Goodrich way of **locking** the plies about the bead. Anchoring them in place. Positive protection against the short plies tearing loose above the bead.

3 100% FULL-FLOATING CORD—Each cord is surrounded by rubber. With ordinary cross-woven fabric, when the cords touch each other, they rub — get hot — break. In Silvertowns, there are no cross cords. No friction.



Goodrich *Triple Protected* Silvertowns

SPECIFY THESE NEW SILVERTOWN TIRES FOR TRUCKS AND BUSES

New Products ON PARADE

(CONTINUED FROM PAGE 56)

operation a special brand is applied which brands the matching grooves in the wood into which the nut fits. Each fastener is rated at 3400 lb. pulling capacity.

The metal panels are folded over the edges of the backing material and under the wood-filled welded steel channel frames which are drawn tightly together by the Permagrip fastener.

Aerotype Valves

TOLEDO STEEL PRODUCTS CO. has announced the addition of Aerotype valves to the Toledo line for 1937. These valves are made from Ludlum Silichrome X, a new steel alloy highly resistant to burning and corrosion. This material was developed especially to meet the rigorous tests imposed by modern engines.

Additional valve life is provided by application of stellite, an exceptionally tough alloy, to the valve seats and valve stem tips.

Belden Primary Cable

THE Belden Mfg. Co., 4689 West Van Buren Street, Chicago, has two new fea-

tures in their new type wire. First, the tinned copper conductors are now covered with a serve of black "Cellophane." And second, outer braids are being applied in a new type of braiding called "Basket-weave."

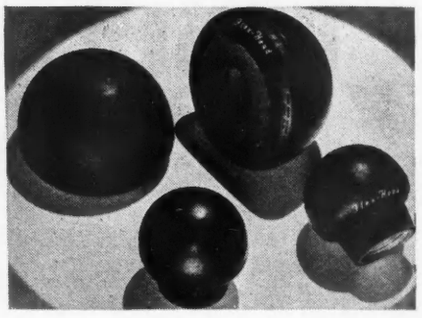
Blackhawk Features:

BLACKHAWK MFG. CO., Milwaukee, has perfected the "Flex-Head" which can be attached to the Blackhawk Porto-Power hydraulic body jack or ordinary mechanical body jacks for use in body repairing.

The dome-shaped Flex-Head is made of a special, resilient compound, vulcanized to a forged steel insert which is tapped with 1¼-in. standard pipe thread to fit the Porto-Power ram and its extensions.

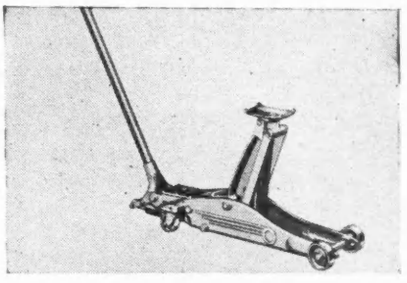
Flex-Heads do the same work as metal attachments, but because of the flexibility of their special composition, conform to body contours when under pressure. Flex-Head units are manufactured in two practical sizes, one with a diameter of 5 in. and the other with a diameter of 3¼ in. Set of four is $16.90.

The new Blackhawk Porto-Power, Model S-100, is a deluxe supplement to the S-50 Porto-Power. This unit consists of a 7-ton hydraulic ram mounted on a convenient stand. The ram, which is separated from the pump by a 6-ft. flexible hose, can be mounted in the press at one end of the stand or used remotely, in any position, with the many attachments furnished for frame straightening, body rebuilding, and general repair work. The stand is built of heavy gauge electrically welded metal. It is 20 in. wide, 48 in. long, and 32 in.



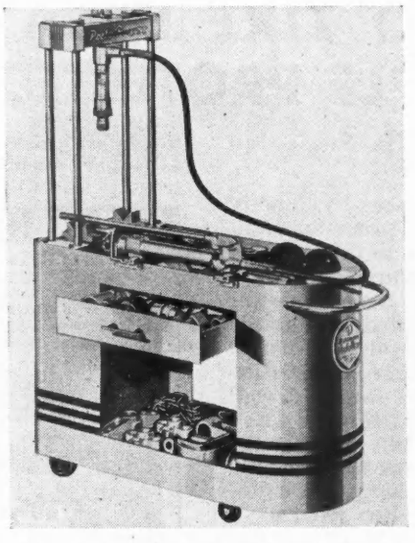
high. The S-100 Porto-Power net price is $195.75.

The new S-13 hydraulic short floor jack, recently introduced, has a capacity of two tons, a low saddle height of 3¾ in. and a



maximum saddle height of 20 in. Maximum frame height is 6 in.

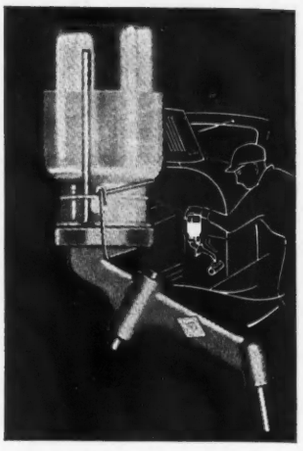
A new type power unit in this jack has eliminated several oil channels and made others more simple and direct.



The 38-in. chassis length and the design of the handle pivot enables the jack to operate with a full pump stroke, while lifting modern beaver-tailed automobiles. The handle will stand in a vertical position if desired. Price is $35.50.

Brake Cylinder Refiller

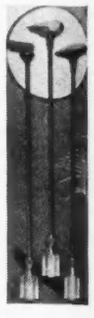
AN IMPROVED type automatic brake cylinder refiller is being featured by the Wagner Electric Corp., St. Louis, Mo. It fills the cylinder to the proper level, and then flow of fluid stops automatically. No overflow is possible. Cylinder cannot be pumped dry, nor can air enter system. Design is such that this refiller reaches the most inaccessible master cylinders.



All mechanic has to do is to insert the nozzle in filler opening and allow refiller to do the rest. Uses no more brake fluid than needed, effects real economies and is clean and economical.

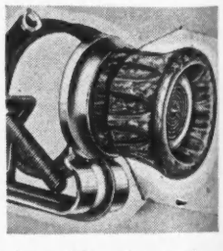
Casco Products

CASCO Products Corp., Bridgeport, Conn., offers a number of items for the convenience and safety of drivers. These include the Casco Auto Fan for use in winter for removing frost from the inside of the windshield or for removing mist. It may also be used as a cooling unit in summer. The No. 35 de luxe fan lists at $3.75.

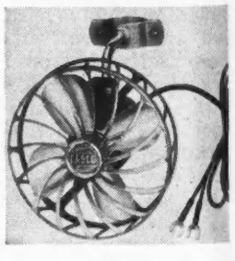


Fender guides are desirable, especially on light trucks, as an aid in judging clearance of fenders. Casco offers a complete range of design in fender guides. They range in price from $1 to $2.

Cigar lighters for truck drivers are offered by Casco for the convenience of the driver as well as for the safety of truck equipment. Electric lighters are considered desirable as a matter of safety to avoid the use of lighted matches within the confines of the truck.



A line of defrosters is also being offered ranging in price from $1.75 to $6. These are the two to four coil types. The two coil type will clear the area of the windshield covered by the defroster. Larger models will clear correspondingly larger areas.



Complete Truck Specifications Table Will Be Published in February

Line Number	MAKE AND MODEL	GENERAL (See Keynote) Tonnage Rating	Chassis Price	Standard Wheelbase	Max. W. B. Furnished	Gross Vehicle Weight with Max. Tires	Chassis Wt. (Stripped)	TIRE SIZES D-dual rear S-single rear Standard Front and Rear	Maximum Tire Size Furnished	ENGINE DETAILS Make and Model	No. of Cylinders, Bore and Stroke	Displacement	Comp. Ratio	Torque lb. ft.	Max. Brake H.P. at R.P.M. Given	Main Bearings Number, Diameter and Length	Governor Standard	TRANSMISSION Make and Model	Forward Spd's	REAR AXLE Make and Model	Gear and Type	Drive & Torque	Gear Ratio Range in High	FRONT AXLE Make and Model	BRAKES SERVICE Make Location Type Operat'n	Lining Area	Drum Area	Drum Material	Hand Location Type	C-A Dimension (Std. W. B.)	FRAME Side Rail Dimensions	Type
1	Autocar. (7) (N) RM	.....	1980	164	182	18500	6715	7.50/20D	9.00/20	Own 315	6–3¾x4¾	315	5.5	210	78–2400	7–3x12½	Y	Own RL5	5	Own RL	2F	H	6.49–7.89	Tim 32502	LO4IDV	466	694	c	2I	84	8x2¾x⅜	T
2	.....(N) RL	.....	2460	164	182	20000	6895	8.25/20D	9.00/20	Own 358	6–4x4¾	358	5.5	250	85–2300	7–3x12½	Y	Own RL5	5	Own RL	2F	H	6.49–7.89	Tim 32502	LO4IDV	466	694	c	2I	84	8¼x3x⅜	T
3	.....(N) D	.....	3600	164	182	25000	7565	9.00/20D	9.75/20	Own 358	6–4x4¾	358	5.5	250	85–2300	7–3x12½	Y	Own DF5	5	Own DF	2F	H	6.49–7.89	Tim 35000	LO4IDV	466	694	c	2I	84	8¼x3x⅜	T
4	.....(N) DF	.....	4200	164	182	26500	8445	9.75/20D	10.50/20	Own 404	6–4¼x4¾	404	5.5	295	97–2200	7–3x14½	Y	Own DF5	5	Own DFA	2F	H	6.49–7.89	Tim 35100	LO4IDV	580	930	c	2I	84	8¼x3x⅜	T
5	.....(N) N	.....	4500	164	218	28000	8705	9.75/20D	10.50/20	Own 404	6–4¼x4¾	404	5.5	295	97–2200	7–3x14½	Y	Own DF5	5	Own N	2F	H	7.20–8.57	Tim 35100	LO4IDV	580	930	c	FD	84	9x3x¼	T
6	.....(N) NFS	.....	5600	195	195	26000	10380	10.50/20D	10.50/20	Own 404	6–4¼x4¾	404	5.5	295	97–2200	7–3x14½	Y	Own DF5	5	Own TF	2F	H	7.20–8.57	Tim 26450	LO4IDV	580	930	c	FD	119½	9x3x¼	T
7	.....(N) NF	.....	5100	164	218	29500	9735	10.50/20D	10.50/24	Own 453	6–4½x4¾	453	5.5	333	108–2200	7–3x14½	Y	Own TF5	5	Own TF	2F	H	7.20–8.57	Tim 35100	LO4IDV	580	930	c	FD	84	10½x3x¼	T
8	.....(N) CF	.....	6000	172	203	30000	10300	36x7	36x7	Own 453	6–4½x4¾	453	5.5	333	108–2200	7–3x14½	Y	Own TF4	4	Own C	2F	R	7.20–9.43	Own SCH	O2IMV	502	930	c	FD	88½	9x3x¼	T
9	.....(N) TS	.....	6600	204	204	29740	11404	10.50/24D	10.50/24	Own 453	6–4½x4¾	453	5.5	333	108–2200	7–3x14½	Y	Own TF4	4	Own TG	2F	H	7.20–8.68	Tim 26452	TO4IA	659	1051	c	FD	129	10½x3x⅞	T
10	.....(N) T	.....	5850	182	218	36000	10485	10.50/20D	11 25/24	Own 501	6–4½x5¼	501	5.5	375	123–2200	7–3¼x14 H	Y	Own TF5	5	Own TG	2F	H	7.20–8.68	Tim 26452	TO4IA	631	930	c	FD	102	10½x3x¼	T
11	.....(T) RMT	.....	2180	142	164	28000	6835	8.25/20D	9.00/20	Own 315	6–3¾x4¾	315	5.5	210	78–2400	7–3x12½	Y	Own RL5	5	Own RL	2F	H	6.49–7.89	Tim 32502	LO4IDV	466	694	c	2I	62	8x2¾x1¼	T
12	.....(T) 1TR	.....	2595	142	164	32000	6875	8.25/20D	9.00/20	Own 358	6–4x4¾	358	5.5	250	85–2300	7–3x12½	Y	Own RL5	5	Own RL	2F	H	6.49–7.89	Tim 32502	LO4IDV	466	694	c	2I	62	8¼x3x⅜	T
13	.....(T) 2TR	.....	4100	142	164	36000	7805	9.00/20D	9.75/20	Own 404	6–4¼x4¾	404	5.5	295	97–2200	7–3x14½	Y	Own DF5	5	Own DFA	2F	H	6.49–7.89	Tim 32502	LO4IDV	567	831	c	2I	62	8¼x3x⅜	T
14	.....(T) 3TR	.....	4800	148	164	40000	8375	9.75/20D	10.50/20	Own 453	6–4½x4¾	453	5.5	333	108–2200	7–3x14½	Y	Own DF5	5	Own N	2F	H	7.20–8.57	Tim 32502	LO4IDV	567	831	c	FD	68	8¼x3x⅜	T
15	.....(T) 4TR	.....	4950	148	164	45000	9265	9.75/20D	10.50/20	Own 453	6–4½x4¾	453	5.5	333	108–2200	7–3x14½	Y	Own TF5	5	Own TF	2F	H	7.20–8.57	Tim 35000	LO4IDV	567	831	c	FD	68	8¼x3x⅜	T
16	.....(T) 5TR	.....	5700	148	164	50000	9655	10.50/20D	10.50/24	Own 501	6–4½x5¼	501	5.5	375	123–2200	7–3¼x14 H	Y	Own TF5	5	Own TG	2F	H	7.20–8.68	Tim 35100	TO4IA	580	930	c	FD	68	9x3x¼	T
17	.....(d) RLD	.....	2460	148	148	16000	6785	8.25/20D	9.00/20	Own 358	6–4x4¾	358	5.5	250	85–2300	7–3x12½	Y	Own RL5	5	Own RL	2F	H	6.49–7.89	Tim 32502	LO4IDV	466	694	c	2I	68	8¼x3x⅜	T
18	.....(d) DP	.....	3750	148	164	18000	7635	9.00/20D	9.00/20	Own 358	6–4x4¾	358	5.5	250	85–2300	7–3x12½	Y	Own DF5	5	Own DFA	2F	H	7.13–7.89	Tim 35000	LO4IDV	567	831	c	2I	68	8¼x3x⅜	T
19	.....(d) DH	.....	4550	148	164	23000	8535	9.75/20D	9.75/20	Own 404	6–4¼x4¾	404	5.5	295	97–2200	7–3x14½	Y	Own DF5	5	Own TF	2F	H	7.20–8.57	Tim 35100	LO4IDV	580	930	c	2I	68	9x3x¼	T
20	.....(d) S	.....	5750	170	170	30000	10025	10.50/20D	10.50/24	Own 453	6–4½x4¾	453	5.5	333	108–2200	7–3x14½	Y	TF4-A3	12	Own CGA	2F	H	7.69–8.52	Tim 26452	LO4IDV	580	930	c	FD	90	10½x3x1¼	T
21	.....(d) C	.....	6650	170	170	44000	11385	10.50/24D	11.25/24	Own 501	6–4½x5¼	501	5.5	375	123–2200	7–3¼x14 H	Y	TF4-A3	12	Tim 79733	2F	H	8.59–10.12	Tim 27452	LT4IDV	688	1050	c	FD	90	10½x3x⅞	T
22	e.u.s. (N) UD	.....	3800	109	145	25000	7950	9.00/20D	9.75/20	Own 358	6–4x4¾	358	5.5	250	85–2300	7–3x12½	Y	Own UDF5	5	Own DF	2F	H	6.49–7.89	Tim 35100	LO4IDV	466	694	c	2I	84¼	8x3x¼	T
23	e.u.s. (N) UDF	.....	4550	109	145	26500	8540	9.75/20D	10.50/20	Own 404	6–4¼x4¾	404	5.5	295	97–2200	7–3x14½	Y	Own UDF5	5	Own DFA	2F	H	6.49–7.89	Tim 26452	LO4IDV	580	930	c	2I	84¼	8x3x¼	T
24	e.u.s. (N) UN	.....	5000	109	163	28000	9070	9.75/20D	10.50/20	Own 404	6–4¼x4¾	404	5.5	295	97–2200	7–3x14½	Y	Own UDF5	5	Own C & N	2F	H	7.20–8.57	Tim 26452	LO4IDV	580	930	c	FD	84¼	8x3x¼	T
25	e.u.s. (N) UNFS	.....	5600	145	145	27000	9585	10.50/20D	10.50/20	Own 404	6–4¼x4¾	404	5.5	295	97–2200	7–3x14½	Y	Own UDF4	4	Own TF	2F	H	7.20–8.57	Tim 26452	B4IMV	637	930	c	FD	120¼	9x3x¼	T
26	e.u.s. (N) UNF	.....	5400	128	163	29500	9780	10.50/20D	10.50/24	Own 453	6–4½x4¾	453	5.5	333	108–2200	7–3x14½	Y	Own UTF5	5	Own TF	2F	H	7.20–8.57	Tim 26452	LO4IMV	580	930	c	FD	103¼	9x3x¼	T
27	e.u.s. (N) UTS	.....	6600	145	145	29900	10927	10.50/24D	10.50/24	Own 453	6–4½x4¾	453	5.5	333	108–2200	7–3x14½	Y	Own UTF4	4	Own TG	2F	H	7.20–8.68	Tim 26452	TO4IA	631	930	c	FD	120¼	10½x3x⅞	T
28	e.u.s. (N) UT	.....	5950	125	163	36000	10440	10.50/20D	10.50/24	Own 501	6–4½x5¼	501	5.5	375	123–2200	7–3¼x14 H	Y	Own UTF5	5	Own TG	2F	H	7.20–8.68	Tim 26452	TO4IA	631	930	c	FD	103¼	9x3x¼	T
29	e.u.s. (T) 1UTR	.....	3850	98	109	32000	7140	8.25/20D	9.75/20	Own 358	6–4x4¾	358	5.5	250	85–2300	7–3x12½	Y	Own UDF5	5	Own DF	2F	H	6.49–7.89	Tim 35000	LO4IDV	466	694	c	2I	73¼	8x3x¼	T
30	e.u.s. (T) 2UTR	.....	4650	98	109	36000	8750	9.00/20D	9.75/20	Own 404	6–4¼x4¾	404	5.5	295	97–2200	7–3x14½	Y	Own UDF5	5	Own C	2F	H	7.20–9.43	Tim 35000	LO4IDV	567	831	c	2I	73¼	8x3x¼	T
31	e.u.s. (T) 3UTR	.....	5200	98	109	40000	8900	9.75/20D	10.50/20	Own 453	6–4½x4¾	453	5.5	333	108–2200	7–3x14½	Y	Own UDF5	5	Own C	2F	H	7.20–9.43	Tim 35000	LO4IDV	567	831	c	FD	73¼	8x3x¼	T
32	e.u.s. (T) 4UTR	.....	5450	98	109	45000	9200	9.75/20D	10.50/20	Own 453	6–4½x4¾	453	5.5	333	108–2200	7–3x14½	Y	Own UTF5	5	Own C	2F	H	7.20–9.43	Tim 26452	LO4IDV	580	930	c	FD	73¼	8x3x¼	T
33	e.u.s. (T) 5UTR	.....	5900	98	109	50000	9790	10 50/20D	10.50/24	Own 501	6–4½x5¼	501	5.5	375	123–2200	7–3¼x14 H	Y	Own UTF5	5	Own CG	2F	H	7.69–8.52	Tim 26452	TO4IA	631	930	c	FD	73¼	9x3x¼	T
34	e.u.s. (d) UDP	.....	4400	100	100	23000	8410	9.00/20D	9.75/20	Own 358	6–4x4¾	358	5.5	250	85–2300	7–3x12½	Y	Own UDF5	5	Own C	2F	H	7.20–9.43	Tim 26452	LO4IDV	580	930	c	2I	75¼	8x3x¼	T
35	e.u.s. (d) US	.....	5850	120	120	31000	10240	10.50/20D	10.50/24	Own 453	6–4½x4¾	453	5.5	333	108–2200	7–3x14½	Y	Fu	5	Own CGA	2F	H	7.69–8.52	Tim 26452	LO4IDV	580	930	c	FD	95¼	9x3x¼	T
36	Chevrolet. Mas. GC	½	360	112	112	.....	.....	6.00/16S	6.50/16S	Own	6–3½x3¾	216	6.2	170	78–3200	4–2¾x5 ⅛	N	Own	3	Own	S½	U	4.11–3.82	Own	O4IH	158	288	c	2I	38¼	5¾x2⅛x⅛	C
37	.....Mas. SA	1½	500	131	131	.....	.....	6.00/20†S	32x6††S	Own	6–3½x3¾	216	6.2	170	78–3200	4–2¾x5 ⅛	N	Own	4	Own	SF	U	5.43–6.17	Own	O4IH	330	532	P	2I	57¾	7x2⅜x⅓	C
38	.....Mas. SB	1½	520	131	131	.....	.....	6.00/20D	32x6	Own	6–3½x3¾	216	6.2	170	78–3200	4–2¾x5 ⅛	N	Own	4	Own	SF	U	5.43–6.17	Own	O4IH	330	532	P	2I	57¾	7x2⅜x⅓	C
39	....Mas. Sp. SB	1½	615	131	131	.....	.....	6.50/20†D	32x6	Own	6–3½x3¾	216	6.2	170	78–3200	4–2¾x5 ⅛	N	Own	4	Own	SF	U	5.43–6.17	Own	O4IH	330	532	P	2I	57¾	7x2⅜x⅓	C
40	.....Mas. SC	1½	525	157	157	.....	.....	6.00/20†S	32x6††S	Own	6–3½x3¾	216	6.2	170	78–3200	4–2¾x5 ⅛	N	Own	4	Own	SF	U	5.43–6.17	Own	O4IH	330	532	P	2I	83¼	7x2⅜x⅓	C
41	.....Mas. SD	1½	545	157	157	.....	.....	6.00/20D	32x6	Own	6–3½x3¾	216	6.2	170	78–3200	4–2¾x5 ⅛	N	Own	4	Own	SF	U	5.43–6.17	Own	O4IH	330	532	P	2I	83¼	7x2⅜x⅓	C
42	....Mas. Sp. SD	1½	640	157	157	.....	.....	6.50/20†D	32x6	Own	6–3½x3¾	216	6.2	170	78–3200	4–2¾x5 ⅛	N	Own	4	Own	SF	U	5.43–6.17	Own	O4IH	330	532	P	2I	83¼	7x2⅜x⅓	C
43	Diamond T...D20	1½–3	2150	151	175	13000	5500	6.00/20D	8.25/20	Her DJXB	6–3½x4½	260	14.	178	77–2600	7–3x10 ⅓	Y	WG T9	4	Eat 1206	SF	H	.....	Cla F308	L4IHV	310	510	a	TD	72	8 ⅛x3 ⅛x1¼	T
44	.....D30	2½–4	2750	151	175	17000	6000	7.00/20D	9.00/20	Her DJXC	6–3¾x4½	298	14.	208	86–2600	7–3x10 ⅓	Y	Cla 200V	5	Eat 17075	SF	H	.....	Cla F308	L4IHV	405	689	a	TD	72	8 ⅛x3 ⅛x1¼	T
45	Federal.....9	¾–1	645	105	121	.....	2850	6.00/20S	6 00/20	Con C400	4–3½x4	143	5.2	97	33–2500	3–1¾x5	N	WG T9	4	Tim 51200H	SF	H	5.14–5.83	Tim 30020H	L4IH	265	388	a	TX	35½	6H x2⅞x⅛	T
46	10	¾–1½	575	128	152	.....	2950	6.00/20S	6.00/20	Her OOB	4–3¾x4½	199	5.3	127	50–2500	3–2x7 ⅛	N	WG T9	4	Tim 51200H	SF	H	5.14–5.83	Tim 30020H	L4IH	265	388	a	TX	51⅝	7x2⅛x⅓	T
47	11	¾–1½	595	128	152	.....	2950	6.00/20S	6.00/20	Her QXB3	6–3¾x4½	205	5.2	134	57–2500	7–2½x10 ⅛	N	WG T9	4	Tim 51200H	SF	H	5.14–5.83	Tim 30020H	L4IH	265	388	a	TX	51⅝	7x2⅛x⅓	T
48	15	1½–2½	695	135	194	.....	4230	6.00/20†S	7.50/20	Her JXA	6–3½x4¼	220	5.3	155	70–2800	7–2½x10 ⅛	SF	WG T9	4	Tim 53521H	SF	H	5.14–6.2	Tim 30000H	L4IH	262	402	a	TX	56¾	8½x2⅞x1¼	T
49	18	2–3	925	135	194	.....	4340	6.50/20D	8.25/20	Her JXB	6–3½x4¼	263	5.4	183	80–2800	7–2½x10 ⅛	SF	WG T9	4	Tim 53303H	SF	H	5.83–6.8	Tim 30003H	L4IH	267	463	a	TX	56¾	8½x2⅞x1¼	T
50	20	2–3½	1075	135	194	.....	4440	6.50/20D	8.25/20	Her JXB	6–3½x4¼	263	5.4	183	80–2800	7–2½x10 ⅛	SF	WG T9	4	Tim 53307H	SF	H	5.83–6.8	Tim 31000H	L4IHV	318	527	a	TX	56¾	8½x2⅞x1¼	T
51	25	2½–4	1295	135	194	.....	5220	7.00/20D	9.00/20	Her JXC	6–3¾x4¼	282	5.4	195	85–2800	7–2½x10 ⅛	SF	Cla 185F	4	Tim 54411H	SF	H	5.83–6.8	Tim 31000H	L4IHV	344	578	a	TX	56¾	8½x2⅞x1¼	T
52	29	3–4½	1745	135	194	.....	5660	7.50/20D	9.00/20	Her JXD	6–4x4¼	320	5.6	225	95–2800	7–2½x10 ⅛	SF	Cla 200V	5	Tim 56411H	SF	H	6.16–7.4	Tim 32501H	L4IHV	380	659	a	TX	56¾	8½x2⅞x1¼	T
53	40	4–5	2625	157	219	.....	7200	9.00/20D	10.50/20	Wau 6MK	6–4¼x4¾	381	6.1	273	98–2400	7–2⅝x12½	Y	Cla 270V	5	Tim 58205H	SF	H	5.57–7.8	Tim 33000H	L4IHV	380	659	a	FD	82	10½x3⅛x⅛	T
54	.....40DR	4–5	2795	157	219	.....	7200	9.00/20D	10.50/20	Wau 6MK	6–4¼x4¾	381	6.1	273	98–2400	7–2⅝x12½	Y	Cla 270V	5	Wis 72200H	2F	H	5.61–7.27	Tim 33000H	L4IHV	380	659	a	FD	82	10½x3⅛x⅛	T
55	50	5–6	3195	157	219	.....	7900	9.00/20D	10.50/20	Wau 6MZ	6–4¼x4¾	404	6.0	292	105–2400	7–2⅝x12½	Y	Cla 270V	5	Tim 75733H	2F	R	7.09–9.41	Tim 35000H	L4IHV	466	768	a	TD	82	10½x3⅛x⅛	T
56	.....C7-C7W	6–7½	4710	195	249	.....	10000	9.75/20D	10.50/24	Wau 6SRK	6–4⅝x5½	517	4.6	350	115–2200	7–3x13⅞	Y	Cla B710	5	Tim 76736H	w/2f	R	7.35–10.2	Tim 36020H	L4IHV	512	867	a	TD	102	7⅜x3½x⅛	T
57	.....C8-C8W	6–7½	5120	195	249	.....	10200	9.75/20D	10.50/24	Wau 6SRK	6–4⅝x5½	517	4.6	350	115–2200	7–3x13⅞	Y	Cla B710	5	Tim 76736W	w/2f	R	7.35–10.2	Tim 36020W	Ws4IA	609	894	a	TD	102	7⅜x3½x⅛	C
58	...X8R-X8RDR	7½	4735	162	186	.....	10475	40x8D	10.50/24	Wau 6SRK	6–4⅝x5½	517	4.6	350	115–2200	7–3x13⅞	Y	Cla B710	5	Tim 68702DP	w/2f	R	8.9–11.14	Own 5008	T2IMV	458	495	a	RI	87	9½x3½x⅜	C
59	.....(c.o.e.) 75	1½–2½	1025	104	159	.....	4280	6.00/20†S	7.50/20	Her JXA	6–3½x4¼	228	5.3	155	70–2800	7–2½x10 ⅛	SF	Cla 185F	4	Tim 53521H	SF	H	5.14–6.2	Tim 32502H	L4IHV	267	452	a	TX	60	8½x2⅞x1¼	T
60	.....(c.o.e.) 80	2–3½	1370	104	159	.....	4500	6.50/20D	8.25/20	Her JXB	6–3½x4¼	263	5.4	183	80–2800	7–2½x10 ⅛	SF	Cla 185F	4	Tim 53307H	SF	H	5.83–6.8	Tim 32502H	L4IHV	318	527	a	TX	60	8½x2⅞x1¼	T
61	.....(c.o.e.) 85	2½–4	1560	104	159	.....	5280	7.00/20D	9.00/20	Her JXC	6–3¾x4¼	282	5.4	195	85–2800	7–2½x10 ⅛	SF	Cla 185F	4	Tim 54411H	SF	H	5.83–6.8	Tim 32502H	L4IHV	344	578	a	TX	60	8½x2⅞x1¼	T
62	.....(c.o.e.) 89	3–4½	1995	104	159	.....	5720	7.50/20D	9.00/20	Her JXD	6–4x4¼	320	5.6	225	95–2800	7–2½x10 ⅛	SF	Cla 200V	5	Tim 56411H	SF	H	6.16–7.4	Tim 32502H	L4IHV	380	659	a	TX	60	8½x2⅞x1¼	T
63	Gen. Mot. (N) T-14	½	395	112	126	.....	2115	6.00/16S	7.00/15S	Own 230	6–3 ⅛x4 ⅛	229	6.2	172	86–3500	4–2 ⅛rx5 ⅛	N	Own	3	Own	S½	U	**4.11	Own	O4IH	168	242	c	2I	38¼	5¼x2¼x⅛	C
64	.....T-16	1½–3	525	131	157	.....	3085	6.00/20†S	7.50/20	Own 230	6–3 ⅛x4 ⅛	229	6.2	172	86–3500	4–2 ⅛rx5 ⅛	N	Own	4	Own	SF	H	5.67–6.20	Own	O4IH	337	477	c	2I	57¾	7x2⅜x⅓	T
65	.....T-16H	1½–3½	695	130	174	.....	3415	6.00/20†S	7.50/20	Own 230	6–3 ⅛x4 ⅛	229	6.2	172	86–3500	4–2 ⅛rx5 ⅛	N	Own	4	Own	SF	H	5.67–6.60	Own	LO4IH	349	477	c	2I	57¾	7 ⅛x2 ⅛x1¼	T
66	.....T-18	1½–4	840	136	178	.....	3840	30x5†S	7.50/20	Own 239	6–3 ⅛x4 ⅝	238	5.1	175	81–3000	4–2 ⅝x7 ⅛	Y	Own	4	Own	SF	H	5.67–6.60	Own	LO4IH	351	482	Ca	TX	60	8x3x¼	T
67	.....T-18H	1½–4½	965	136	178	.....	4100	6.50/20D	34x7	Own 239	6–3 ⅛x4 ⅝	238	5.1	175	81–3000	4–2 ⅝x7 ⅛	Y	Own	4	Own	SF	H	5.83–6.80	Own	L4IH	342	533	Ca	TX	60	8x3x¼	T
68	.....T-23	2–4½	1310	136	196	.....	4575	7.00/20D	34x7	Own 257	6–3 ⅛x4 ⅝	257	5.0	190	87–2800	4–2 ⅝x7 ⅛	Y	Own	4	Own	SF	H	5.83–6.80	Own	L4IHV	342	533	Ca	TX	60	8x3x¼	T
69	.....T-23H	2–5	1540	136	196	.....	5220	7.50/20D	9.00/20	Own 257	6–3 ⅛x4 ⅝	257	5.0	190	87–2800	4–2 ⅝x7 ⅛	Y	Own	4	Own	SF	H	5.63–7.20	Own	L4IHV	386	613	Ca	TX	60	8x3x¼	T
70	.....T-33	2½–6	1785	136	196	.....	5560	7.50/20D	9.75/20	Own 286	6–3½x4⅝	286	4.9	205	90–2600	4–2⅝x7 ⅛	Y	Own	4	Own	SF	H	5.63–7.20	Own	L4IHV	389	663	a	TX	60	8 ⅛x3 ⅛x1¼	T
71	.....T-33H	2½–6½	2185	136	196	.....	6175	8.25/20D	10.50/20	Own 286	6–3½x4⅝	286	4.9	205	90–2600	4–2⅝x7 ⅛	Y	Own	4	Own	SF	R	6.43–7.16	Own	L4IHV	480	768	a	TX	60	9 ⅛x3½x⅛	T
72	.....T-46	3½–7	2485	136	196	.....	6810	8.25/20D	10.50/20	Own 331	6–3¾x5	331	4.7	230	94–2500	4–2½x8 ⅛	Y	Own	5	Own	SF	R	6.43–7.16	Own	L4IHV	528	848	a	TX	60	9 ⅛x3½x⅛	T
73	.....T-61	4–8	3985	136	196	.....	7980	9.00/20D	11.25/20	Own 400	6–4½x5	400	4.7	296	110–2300	4–2.7x8 ⅛	Y	Own	5	Own	2F	R	7.38–9.41	Own	TW4IA	581	921	a	TX	60	9 ⅛x3½x⅛	TL
74	.....T-61H	5–10	4275	136	196	.....	8470	9.00/20D	11.25/24	Own 400	6–4½x5	400	4.7	296	110–2300	4–2.7x8 ⅛	Y	Own	5	Own	2F	R	7.34–9.19	Own	TW4IA	581	921	a	TX	60	9 ⅛x3½x⅛	TL
75	....(c.o.e.) F-16	1½–3½	635	108	155	.....	3300	6.00/20†S	7.50/20	Own 230	6–3 ⅛x4 ⅛	229	6.2	172	86–3500	4–2 ⅛rx5 ⅛	N	Own	4	Own	SF	H	5.67–6.20	Own	LO4IH	349	477	c	2I	64	7 ⅛x2 ⅛x1¼	T
76	....(c.o.e.) F-16H	1½–4	775	108	174	.....	3490	6.00/20†S	7.50/20	Own 230	6–3 ⅛x4 ⅛	229	6.2	172	86–3500	4–2 ⅛rx5 ⅛	N	Own	4	Own	SF	H	5.67–6.60	Own	LO4IH	349	477	c	2I	64	7 ⅛x2 ⅛x1¼	T
77	....(c.o.e.) F-18	1½–4½	970	108	178	.....	3910	30x5†S	7.50/20	Own 239	6–3 ⅛x4 ⅝	238	5.1	175	81–3000	4–2 ⅝x7 ⅛	Y	Own	4	Own	SF	H	5.67–6.60	Own	LO4IH	351	482	Ca	TX	64	8x3x¼	T
78	....(c.o.e.) F-18H	1½–4½	1095	108	178	.....	4170	6.50/20D	34x7	Own 239	6–3 ⅛x4 ⅝	238	5.1	175	81–3000	4–2 ⅝x7 ⅛	Y	Own	4	Own	SF	H	5.83–6.80	Own	L4IH	342	533	Ca	TX	64	8x3x¼	T
79	....(c.o.e.) F-23	2–5	1470	108	196	.....	4690	7.00/20D	34x7	Own 257	6–3 ⅛x4 ⅝	257	5.0	190	87–2800	4–2 ⅝x7 ⅛	Y	Own	4	Own	SF	H	5.83–6.80	Own	L4IHV	345	583	a	TX	64	8x3x¼	T
80	....(c.o.e.) F-23H	2–6	1700	108	196	.....	5280	7.50/20D	9.00/20	Own 257	6–3 ⅛x4 ⅝	257	5.0	190	87–2800	4–2 ⅝x7 ⅛	Y	Own	4	Own	SF	H	5.63–7.20	Own	L4IHV	389	663	a	TX	64	8x3x¼	T
81	....(c.o.e.) F-33	2½–6½	1965	108	196	.....	5600	7.50/20D	9.75/20	Own 286	6–3½x4⅝	286	4.9	205	90–2600	4–2⅝x7 ⅛	Y	Own	4	Own	SF	H	5.63–7.20	Own	L4IHV	437	743	a	TX	64	8 ⅛x3 ⅛x1¼	T
82	....(c.o.e.) F-33H	2½–7	2365	108	196	.....	6215	8.25/20D	10.50/20	Own 286	6–3½x4

Complete Truck Specifications Table Will Be Published in February

Line Number	MAKE AND MODEL	GENERAL (See Keynote) Tonnage Rating	Chassis Price	Standard Wheelbase	Max. W. B. Furnished	Gross Vehicle Weight with Max. Tires	Chassis Wt. (Stripped)	TIRE SIZES D-dual rear S-single rear: Standard Front and Rear	TIRE SIZES: Maximum Tire Size Furnished	ENGINE DETAILS: Make and Model	No. of Cylinders, Bore and Stroke	Displacement	Comp. Ratio	Torque lb. ft.	Max. Brake H.P. at R.P.M. Given	Main Bearings: Number, Diameter and Length	Governor Standard	TRANSMISSION: Make and Model	TRANSMISSION: Forward Sp'ds	REAR AXLE: Make and Model	REAR AXLE: Gear and Type	REAR AXLE: Drive & Torque	REAR AXLE: Gear Ratio Range in High	FRONT AXLE: Make an. Model	BRAKES SERVICE: Make Location Type Operat'n	BRAKES SERVICE: Lining Area	BRAKES SERVICE: Drum Area	BRAKES SERVICE: Drum Material	BRAKES: Hand Location Type	C-A Dimension (Std. W. B.)	FRAME: Side Rail Dimensions	FRAME: Type
86	Mack, Jr. (*)2M4A	.....	575	114	120	4500	.....	6.00/16D	6.50/16	Own MR140	4-3 7/16 x4 3/4	140	5.4	98	45–2800	3–2 1/4 x4 1/4	N	WG 84C	3	Own MR45	SF	H	4.55–4.90	Own MR2	L41H	198	242	C	TX	38 3/4	5 1/8 x2 1/4 x 1/4	C
87	.....(*)2M6A	.....	600	114	120	4500	.....	6.00/16D	6.50/16	Own MR209	6-3 7/16 x4 3/8	209	5.4	145	72–3000	4–2 1/4 x5 1/4	N	WG 84C	4	Own MR45	SF	H	4.55–4.90	Own MR2	L41H	198	242	C	TX	38 3/4	5 1/8 x2 1/4 x 1/4	C
88	.....(*)2M6AS	.....	665	114	120	5000	.....	6.00/16D	7.00/16	Own MR209	6-3 7/16 x4 3/8	209	5.4	145	72–3000	4–2 1/4 x5 1/4	N	WG 86	4	Own MR5	FF	H	**5.10	Own MR2	L41H	213	327	C	TX	38 3/4	5 1/8 x2 1/4 x 1/4	C
89	.....10MF	.....	795	108	166	10000	3090	6.00/20††D	7.50/20	Own MR209	6-3 7/16 x4 3/8	209	5.4	145	72–3000	4–2 1/4 x5 1/4	N	OwnMR1B	4	Own MR10	FF	H	5.28–6.6	Own MR10	L41H	295	366	C	TX	57	7 1/8 x2 3/8 x 1/2	C
90	.....11M	.....	675	139	190	11000	2955	6.00/20††D	7.50/20	Own MR209	6-3 7/16 x4 3/8	209	5.4	145	72–3000	4–2 1/4 x5 1/4	N	OwnMR1B	4	Own MR11	FF	H	5.28–6.6	Own MR11	L41H	338	366	C	TX	57 1/2	7 1/8 x2 3/8 x 1/2	C
91	.....21M	.....	835	139	190	12000	3541	6.00/20D	7.50/20	Own MR228	6-3 5/8 x4 1/4	228	5.4	150	74–3000	7–2 5/8 x10 1/4	N	OwnMR1D	4	Own MR12	FF	H	5.28–6.6	Own MR21	L41H	338	366	C	TX	57 1/2	7 1/8 x2 3/8 x 1/2	CCC
92	.....31M	.....	1095	142	190	14500	3827	6.50/20D	8.25/20	Own MR268	6-3 5/8 x5	268	5.2	175	85–3000	7–2 5/8 x10 1/4	N	OwnMR2B	4	Own MR145	FF	H	5.28–6.6	Own MR31	L41HV	410	523	C	TX	60 1/2	7 1/8 x3 x 1/4	
93	.....31MS	.....	1205	142	190	14500	4077	6.50/20D	8.25/20	Own MR268	6-3 5/8 x5	268	5.2	175	85–3000	7–2 5/8 x10 1/4	N	OwnMR2B	4	Ow MRdr145	FF	H	6.62–8.21	Own MR31	L41HV	410	523	C	TX	60 1/2	7 1/8 x3 x 1/4	CCC
94	Sterling....FD140	7–8	6240	195	225	.....	.....	10.50/20D	10.50/24	Wau 6SRK	6-4 5/16 x5 1/2	517	4.5	331	110–2300	7–3x13 3/8	Y	Own UC2	4	Own	2F	R	7.16–10.0	Tim 26450TW	Ws4IA	574	1002	...	TX	107	9x3 1/4 x 1/4	L
95	Stewart.....40H	1/2	495	113	113	.....	2110	6.00/16D	6.50/16	Wau	4-3 1/4 x4	133	6.0	98	35–2400	3–2 1/4 x4 1/4	N	WG	3	Spi	SF	H	5.1–4.27	Spi	L41H	216	388	c	T	44	6x2 1/4 x 1/4	T
96	.....60H	3/4	545	128	128	.....	2325	6.00/16D	6.50/16	Con	6-3x4	170	6.2	124	60–2800	4–2 1/4 x5 1/4	N	WG	3	Spi	SF	H	5.1–4.27	Spi	L41H	216	388	c	T	52	6 1/8 x2 1/4 x 1/4	T
97	.....45A	1 1/2–2	645	134	188	11000	3490	6.00/20D	7.50/20	Wau	6-3 3/8 x4 1/2	222	5.6	155	65–2800	4–2 3/8 x5 5/8	N	WG	4	Cla	SF	H	5.5–6.8	Cla	L41H	256	472	a	T	54	8 1/2 x2 3/8 x 1/4	T
98	.....45AS	1 1/2–2 1/2	795	144	188	11000	3590	6.00/20D	7.50/20	Wau	6-3 3/8 x4 1/2	222	5.6	155	65–2800	4–2 3/8 x5 5/8	N	WG	4	Eat	SF	H	5.83–8.11	Cla	L41H	....	....	a	T	64	8 1/2 x2 3/8 x 1/4	T
99	.....47A	2–3	895	134	205	13000	4340	6.50/20D	8.25/20	Wau	6-3 1/2 x4 1/4	245	5.0	165	70–2800	7–2 5/8 x10 1/4	N	WG	4	Cla	SF	H	6.37–6.88	Cla	L41HV	266	512	a	T	54	8 1/2 x2 3/8 x 1/4	T
100	.....50A	2 1/2–3 1/2	1095	134	205	14500	4490	6.50/20D	8.25/20	Wau	6-3 5/8 x4 1/4	263	5.6	175	77–2800	7–2 5/8 x10 1/4	N	WG	4	Cla	SF	H	6.37–6.88	Cla	L41HV	365	....	a	T	54	8 1/2 x2 3/8 x 1/4	T
101	.....50AS	2 1/2–3 1/2	1275	144	205	14500	4590	7.00/20D	8.25/20	Wau	6-3 5/8 x4 1/4	263	5.6	175	77–2800	7–2 5/8 x10 1/4	N	WG	4	Eat	SF	H	5.83–8.11	Cla	L41HV	368	....	a	T	64	8 1/2 x2 3/8 x 1/4	T
102	.....49A	3–4	1695	144	220	16000	5640	7.00/20D	9.75/20	Wau	6-3 3/4 x4 1/4	282	5.2	190	83–2800	7–2 5/8 x10 1/4	N	Fu	5	Cla	SF	R	7.16–6.4	Cla	L41HV	....	....	a	T	64	10x2 3/4 x 1/4	T
103	.....58X	3 1/2–4 1/2	2490	160	235	21000	6690	7.50/20D	10.50/20	Wau	6-4 1/4 x4 3/8	404	5.7	265	88–2500	7–2 5/8 x12 1/2	Y	Fu	5	Cla	SF	R	7.16–6.4	Cla	L41HV	478	790	E	T	73 11/16	9 1/8 x2 3/4 x 3/8	T
104	.....18XS	3 1/2–4 1/2	2890	160	235	21000	7190	7.50/20D	10.50/20	Wau	6-4 1/4 x4 3/8	404	5.7	265	88–2500	7–2 5/8 x12 1/2	Y	Fu	5	Tim	WF	R	7.25–8.3	Cla	B4IMV	550	898	E	T	73 11/16	9 1/8 x2 3/4 x 3/8	T
105	38-8	3 1/2–5	4090	170	241	25000	8072	9.00/20D	10.50/22	Lyc	8-3 3/4 x4 1/4	420	5.2	300	120–2800	5–2 3/4 x12	Y	BL	5	Tim	WF	R	7.25–8.3	Eat	B4IMV	550	898	E	T	73 5/8	9 1/8 x2 3/4 x 3/8	T
106	38-6	3 1/2–5	4090	170	241	25000	8070	9.00/20D	10.50/22	Wau	6-4 5/16 x5 1/2	517	4.5	330	110–2800	7–3x13 3/8	Y	BL	5	Tim	WF	R	7.25–8.3	Eat	B4IMV	550	898	E	T	75 5/8	9 1/8 x2 3/4 x 3/8	T
107	.....31X	5–8	5490	165	235	30000	9490	9.75/20D	10.50/24	Wau	6-4 5/16 x5 1/2	517	4.5	330	110–2000	7–3x13 3/8	Y	BL	12	Tim	WF	R	8.2–9.0	Eat	Ws4IA	614	1004	E	TX	73 1/16	9 1/8 x2 3/4 x 1/4	T
108	Terraplane.....70	3/4	***	117	...	.....	2150	6.00/16D	6.00/16	Own	6-3x5	212	6.2	160	96–3900	3–	N	Own	3	Own	S1/2	H	**4.55	Own	B4H	154	....	P	2I	32 1/4	7 1/4 x1 1/4	C
109	78	3/4	***	124	...	.....	.....	6.00/16D	6.00/16	Own	6-3x5	212	6.2	160	96–3900	3–	N	Own	3	Own	S1/2	H	**4.55	Own	B4H	154	....	P	2I	39 1/4	7 1/4 x1 1/4	
110	Ward La. (D)127D	3–4	***	187	...	21000	7500	9.00/20D	9.75/20	Bud 415	6-4x5 1/2	415	...	308	105–2200	7–3x11 1/2	Y	Fu 5A380	5	Tim 58205H	SF	R	5.25–7.8	Tim 33000H	L41HV	384	694	a	TD	108 1/2	12x3 1/4	T
111	.....137D	5–6	***	204	...	26000	9000	9.75/20D	10.50/20	Bud 468	6-4 1/4 x5 1/2	468	...	346	118–2200	7–3x11 1/2	Y	Fu 5A620	5	Wis 1337BH	2F	R	5.6–9.4	Shu 15682B	L41HV	488	792	a	CD	125	12x3 1/4	T
112	.....138D	5–6	***	204	...	26000	9000	9.75/20D	10.50/20	Her DRXB	6-4 3/8 x5 1/4	474	...	350	120–2000	7–3 1/2 x3 1/4	Y	Fu 5A620	5	Wis 1337BH	2F	R	5.6–9.4	Shu 15682B	L41HV	488	792	a	CD	125	12x3 1/4	T
113	.....156D	7 1/2	***	218	...	32000	10500	10.50/20D	10.50/24	Her DRXB	6-4 3/8 x5 1/4	474	...	350	120–2000	7–3 1/2 x3 1/4	Y	Fu 5A602	5	Wis 1747KW	2F	R	6.0–9.2	Shu 15693WB	Ws4IA	547	867	a	CD	139	12x3 1/4	T
114	White.....700	1–2	985	136	196	.....	4148	6.50/20S	7.50/20	Own 250	6-3 1/8 x4 1/2	250	5.8	165	70–2600	7–2 7/16 x10 .7	Y	Own 45B	4	Own 36C	SF	H	4.85–6.80	Own 32D	L41H	270	424	a	TX	60 1/4	7 11/16 x3 1/8	T
115	.....700K		1350	136	148	.....	4350	6.50/20D	7.50/20	Own 250	6-3 1/8 x4 1/2	250	5.8	165	70–2600	7–2 7/16 x10 .7	Y	Own 45B	4	Own 39C	2F	H	5.57–7.62	Own 32D	L41HV	270	424	a	TX	60 1/4	7 11/16 x3 1/8	T
116	705	1 1/2–2 1/2	1725	136	226	.....	4883	7.00/20D	9.00/20	Own 270	6-3 3/4 x4 1/2	270	5.5	195	83–2800	7–2 7/16 x10 .7	Y	Own 28B	4	Own 37C	SF	H	5.10–6.83	Own 22D	L41HV	364	557	a	TX	60 1/4	7 1/8 x3 1/4	T
117	710	2–4 1/2	2250	136	226	.....	5959	7.50/20D	9.00/20	Own 303	6-3 11/16 x4 1/2	303	5.5	215	92–2800	7–2 7/16 x10 .7	Y	Own 41B	5	Own 20C	SF	H	5.11–7.17	Own 19D	L41HV	428	557	a	TX	60 1/4	7 1/8 x3 1/4	TPPT
118	.....(c.o.e.) 810	2–4 1/2	2550	97	193	.....	6010	7.50/20D	9.00/20	Own 303	6-3 11/16 x4 1/2	303	5.5	215	92–2800	7–2 7/16 x10 .7	Y	Own 41B	5	Own 20C	SF	H	5.11–7.17	Own 23D	L41HV	428	557	a	TX	60	7 1/8 x3 1/4	
119	.....700R	3/4	***	136	196	.....	3350	6.00/20S	7.50/20	Own 250	6-3 1/8 x4 1/2	250	5.8	165	70–2600	7–2 7/16 x10 .7	Y	Own 45B	4	Own 36C	SF	H	4.85–6.80	Own 32D	L41H	270	424	a	TX	60 1/4	7 11/16 x3 1/8	PTT
120	.....700A	2–3	***	136	196	.....	4520	6.50/20D	7.50/20	Own 250	6-3 1/16 x4 1/2	250	5.8	165	70–2600	7–2 7/16 x10 .7	Y	Own 45B	4	Own 36C	SF	H	4.85–6.80	Own 32D	L41H	270	424	a	TX	60 1/4	7 11/16 x3 1/8	
Four Wheel Drive																															
121	Autocar (7) (d) 4x4 DF	.....	5000	163	163	20000	8415	9.00/20D	9.00/20	Own 404	6-4 1/4 x4 3/4	404	5.5	295	97–2200	7–3x14 3/8	Y	Own DF4	8	Tim 5002	2F	H	**7.35	Tim F501	T4IMV	417	659	c	2I	84 1/2	9x3x 1/4	
122	.....(d) 4x4 N	.....	6000	167	167	24000	9900	9.75/20D	9.75/20	Own 404	6-4 1/4 x4 3/4	404	5.5	295	97–2200	7–3x14 3/8	Y	Own DF4	8	Tim 72000	2F	H	**7.27	Tim F213	T4IMV	568	866	c	2I	88 1/2	9x3x 1/4	TTT
123	.....(d) 4x4 NF	.....	6750	168	168	26000	10915	9.75/20D	9.75/20	Own 453	6-4 1/2 x4 3/4	453	5.5	333	108–2200	7–3x14 3/8	Y	Own TF4	8	Tim 1337	2F	H	**7.52	Tim F313	T4IMV	639	975	c	2I	89 1/2	10 1/2 x3x 1/2	TTT
124	.....(d) 4x4 S	.....	7250	168	168	30000	11145	10.50/20D	10.50/20	Own 501	6-4 1/2 x5 1/4	501	5.5	375	123–2200	7–3 1/4 x14 1/2	Y	Own TF4	8	Tim 1337	2F	H	**7.52	Tim F313	T4IMV	639	975	c	2I	89 1/2	10 1/2 x3x 1/2	
125	F.W. D.....H8	1 1/2	2440	132	156	13000	4700	6.50/20D	8.25/20	Wau BK	6-3 3/8 x4 1/4	282	5.3	188	85–3200	7–2 5/8 x10 1/4	Y	Fu 5B33	5	Tim 53539A1	S	H	5.58–8.0	Wis F33-8	L41HV	286	452	G	T4	67 3/4	7 1/4 x2 3/4 x 1/4	C
126	.....H6	2–2 1/2	3560	138	160	14800	5800	9.00/20D	11.25/20S	Wau MS	6-3 3/4 x4 3/4	315	4.5	200	72–2500	7–2 5/8 x12 1/2	Y	BL 2352	5	Own H	BF	H	6.00–8.82	Own H	OT4XM	220	252	G	2I	85	7x3x 1/2	C
127	.....HH6	2 1/2–3	4285	138	170	18700	6900	9.75/20S	10.50/20	Wau MK	6-4 1/2 x4 3/4	381	6.1	256	85–2500	7–2 5/8 x12 1/2	Y	BL 3352	5	Own HU	BF	H	6.72–8.84	Own HU	L41HV	504	867	G	T4	85	7x3x 1/2	C
128	.....B3		4200	124	156	16700	6460	36x6S	40x8S	Own A	4-4 3/4 x5 1/2	391	4.0	220	56–1000	3–2x11	Y	CO & DAF	3	Own B	BF	H	7.35–8.9	Own B	OT4XM	92	110	G	2I	93	5 1/4 x2 1/2 x 1/2	C
129	.....CU6	3 1/2–4	5145	147	179	21300	8400	10.50/20S	11.25/20	Wau SRS	6-4 1/2 x5 1/2	411	4.6	260	91–2300	7–3x13 3/8	Y	Own U	5	Own U	BF	H	6.72–8.84	Own U	L41HV	504	867	G	T4	92	7x3x 1/2	C
130	.....CU6A	3 1/2–4	4845	147	179	21100	8100	10.50/20S	11.25/20	Wau SRS	6-4 1/2 x5 1/2	411	4.6	260	91–2300	7–3x13 3/8	Y	Fu 5A62	5	Own U	BF	H	6.72–8.84	Own U	L41HV	504	867	G	T4	92	7x3x 1/2	C
131	.....SSU	4–5	5295	147	179	23600	8600	11.25/20S	11.25/20	Wau SRL	6-4 1/2 x5 1/2	462	4.6	302	102–2400	7–3x13 3/8	Y	Own U	5	Own U	BF	H	6.72–8.84	Own U	L41HV	504	867	G	T4	92	7x3x 1/2	C
132	.....SSUA	4–5	4995	147	179	23300	8300	11.25/20S	11.25/20	Wau SRL	6-4 1/2 x5 1/2	462	4.5	302	102–2400	7–3x13 3/8	Y	Fu 5A62	5	Own U	BF	H	6.72–8.84	Own U	L41HV	504	867	G	T4	92	7x3x 1/2	C
133	.....MJ5	5–6	6435	150	180	27700	11200	10.50/20D	12.00/20	Wau SRK	6-4 1/2 x5 1/2	517	4.5	330	110–2300	7–3x13 3/8	Y	BL 7341	8	Wis 1337	2F	H	5.63–7.35	Wis 1337	B4IMV	666	976	G	T4	95	8x3x 1/2	C
134	.....LBU	5–6	4800	171	Op	23600	8900	9.00/20D	11.25/20	Wau SRS	6-4 1/2 x5 1/2	411	4.6	260	91–2300	7–3x13 3/8	Y	BL 55	4	Own U	BF	H	6.72–8.84	Own U	O4IM	720	867	G	4D	Opt	7x3x 1/2	C
135	.....MF6	5–6	5935	147	179	25000	9100	10.50/20D	11.25/20	Wau SRK	6-4 1/2 x5 1/2	517	4.5	330	110–2300	7–3x13 3/8	Y	Own U	4	Own MF	BF	H	6.72–8.84	Own MF	L41HV	504	867	G	T4	92	8x3x 1/2	C
136	.....MJ6	6–7	6750	150	180	29000	11400	10.50/20D	12.00/20	Wau 125	6-4 3/4 x5 1/2	462	5.0	325	125–2600	7–3x13 3/8	Y	BL 7341	8	Wis 1337	2F	H	5.63–7.35	Wis 1337	B4IMV	666	976	G	T4	95	8x3x 1/2	C
137	.....MJ6	6–7 1/2	7600	150	180	31000	11650	12.75/20S	13.50/20	Wau 125	6-4 3/4 x5 1/2	462	5.0	325	125–2600	7–3x13 3/8	Y	BL 7341	8	Wis 1757	2F	H	5.39–8.33	Wis 1757	B4IMV	666	976	G	T4	95	8x3x 1/2	C
138	.....M7	7 1/2–10	8575	150	180	37600	12300	40.00/10D	13.50/20	Wau RB	6-5x5 3/4	677	4.4	440	145–2000	4–3 1/2 x11 3/8	Y	BL 7341	8	Wis 1757	2F	H	6.39–8.33	Wis 1757	B4IMV	666	976	G	T4	95	10x3x 1/2	C
139	.....M10	10–11	9600	150	180	40000	13400	13.50/20S	13.50/20	Her HXE	6-5 3/4 x6	935	5.3	610	198–2000	7–3 1/2 x17	Y	BL 7440	8	Wis 1910	2F	H	7.16–9.35	Wis 1910	Ws4IA	639	976	G	T4	95	10x3x 1/2	C
140	.....T26	6–7	2825	144	144	26000	5100	8.25/20D	9.00/20	Wau BK	6-3 3/4 x4 1/4	282	5.3	188	85–3200	7–2 5/8 x10 1/4	Y	Fu 5B33	5	Tim 53539A1	S	H	5.58–8.00	Wis F33-8	L41HV	286	452	G	T4	67 3/4	7 1/4 x2 3/4 x 1/4	C
141	.....T32	7 1/2–10	4890	132	132	32000	9000	9.00/20D	9.75/20	Wau 110	6-4x4 3/4	358	5.0	254	110–2800	7–2 5/8 x12 1/2	Y	BL 3353	5	Own HU	BF	H	7.3–9.88	Own HU	L41HV	568	868	G	T4	70 5/8	10x3x 1/4	C
142	.....T40	10–15	5450	134	134	40000	10500	9.75/20D	10.00/20	Wau 125	6-4 3/8 x5 1/4	462	5.0	325	125–2600	7–3x13 3/8	Y	BL 5351	5	Own U	BF	H	7.3–11.2	Own U	L41HV	568	868	G	T4	71	10x3x 1/4	C
143	.....T60	15–25	6935	134	134	60000	11000	9.75/20D	10.50/20	Wau RB	6-5x5 3/4	677	4.4	440	145–2000	4–3 1/2 x11 3/8	Y	BL 7351	5	Own MF	BF	H	5.17–14.9	Own MF	O4A	568	868	G	T4	80	10x3x 1/2	C
144	.....X6	10–12	8165	190	Op	40000	13400	10.50/20D	10.50/20	Wau 125	6-4 3/8 x5 1/2	462	5.0	325	125–2600	7–3x13 3/8	Y	Own U	5	Own MF	BF	H	6.72–8.84	Own MF	O6IA	864	....	G	4I	137	7x3x 1/2	C
145	.....MX6	10–15	12225	200	Op	52400	17200	13.50/20S	13.50/20	Wau RB	6-5x5 3/4	677	4.4	440	145–2000	4–3 1/2 x11 3/8	Y	BL 7341	8	Wis 131TW	2F	H	5.78–9.35	Wis 131F	Ws6IA	828	1302	G	T4	145	10x3x 1/2	C
146	.....(*)LM	RM	3650	138	138	.....	6500	9.00/20S	9.00/20S	Wau MK	6-4 1/2 x4 3/4	381	6.1	256	85–2500	7–2 5/8 x12 1/2	Y	Own	6	Own H	2F	H	6.56–7.9	Own H	O4TXM	160	170	CI	2I	85	7x3x 1/2	C
147	.....(*)HM	RM	4135	138	138	.....	7100	9.75/20S	9.75/20S	Wau MK	6-4 1/2 x4 3/4	381	6.1	256	85–2500	7–2 5/8 x12 1/2	Y	Own	6	Own HH	2F	H	7.35–8.84	Own HH	L41HV	504	867	G	T4	85	7x3x 1/2	C
Six Wheelers																															
148	Autocar (7)																														
149	(a) 6x2 RL	2F	2715	164	182	32000	9345	8.25/20D	9.00/20	Own 358	6-4x4 3/4	358	5.5	250	85–2300	7–3x12 3/8	Y	Own RL5	5	Own RL	2F	H	6.49–7.89	Tim 32502	LO4IDV	466	694	c	FD	84	8 11/16 x3x 1/2	T
150	(a) 6x2 DF	2F	4250	164	218	36000	10485	9.00/20D	9.75/20	Own 404	6-4 1/2 x4 3/4	404	5.5	295	97–2200	7–3x14 3/8	Y	Own DF5	5	Own DFA	2F	H	6.49–7.89	Tim 35100	LO4IDV	580	930	c	FD	84	9x3x 1/4	T
151	(a) 6x2 NF	2F	5300	182	218	40000	11985	9.75/20D	10.50/20	Own 453	6-4 1/2 x4 3/4	453	5.5	333	108–2200	7–3x14 3/8	Y	Own TF5	5	Own C	2F	H	7.20–9.43	Tim 26452	LO4IDV	580	930	c	FD	102	10 3/4 x3x 1/4	T
152	(a) 6x2 T	2F	5900	208	222	45000	12985	9.75/20D	10.50 20	Own 501	6-4 1/2 x5 1/4	501	5.5	375	123–2200	7–3 1/4 x14 1/2	Y	Own TF5	5	Own CG	2F	H	7.69–8.52	Tim 26452	TO4IA	631	930	c	FD	128	10 1/2 x3x 1/2	T
153	6x4 DF	4R	5750	139	139	35000	11005	9.00/20D	9.00/20	Own 404	6-4 1/2 x4 3/4	404	5.5	295	97–2200	7–3x14 3/8	Y	Own DF5	5	Tim SD251	2F	H	7.66–8.44	Tim 35100	L41HV	667	758	c	FD	59	9x3x 1/4	TL
154	6x4 TO	4R	8550	184	184	40000	14115	9.75/20D	9.75/20	Own 501	6-4 1/2 x5 1/4	501	5.5	375	123–2200	7–3 1/4 x14 1/2	Y	Own TF5	5	Tim SDD352	2F	H	8.15–9.11	Tim 26452	T4IA	598	907	c	FD	104	10 1/2 x3x 1/2	TL
155	6x4 TD	4R	8700	142	142	40000	14415	9.75/24D	9.75/24	Own 501	6-4 1/2 x5 1/4	501	5.5	375	123–2200	7–3 1/4 x14 1/2	Y	Own TF4A3	12	Tim SDD352	2F	H	8.15–9.11	Tim 26452	T4IA	598	907	c	FD	142	10 1/2 x3x 1/2	TL
156	6x4 TC	4R	9500	142	142	52000	15045	10.50/24D	10.50/24	Own 501	6-4 1/2 x5 1/4	501	5.5	375	123–2200	7–3 1/4 x14 1/2	Y	Own TF4A3	12	Tim SDD452	2F	H	8.15–9.11	Tim 26452	T4IA	598	907	c	FD	142	10 1/2 x3x 1/2	TL
157	e.u.s. (a) 6x2 UD	2F	4700	127	145	32000	10930	9.00/20D	9.75/20	Own 358	6-4x4 3/4	358	5.5	250	85–2300	7–3x12 3/8	Y	Own UDF5	5	Own C	2F	H	7.20–9.43	Tim 35100	LO4IDV	580	930	c	FD	102 1/4	8x3x 1/4	T
158	e.u.s. (a) 6x2 UN	2F	5200	128	163	36000	11660	9.00/20D	9.75/20	Own 404	6-4 1/4 x4 3/4	404	5.5	295	97–2200	7–3x14 3/8	Y	Own UDF5	5	Own C	2F	H	7.20–9.43	Tim 26452	LO4IDV	580	930	c	FD	103 1/4	9x3x 1/4	T
159	e.u.s. (a) 6x2 UNF	2F	5500	128	163	40000	12290	9.75/20D	10.50/20	Own 453	6-4 1/2 x4 3/4	453	5.5	333	108–2200	7–3x14 3/8	Y	Own UTF5	5	Own C	2F	H	7.20–9.43	Tim 26452	LO4IDV	580	930	c	FD	103 1/2	9x3x 1/4	T
160	e.u.s. (a) 6x2 UT	2F	5800	145	163	45000	13130	9.75/20D	10.50/20	Own 501	6-4 1/2 x5 1/4	501	5.5	375	123–2200	7–3 1/4 x14 1/2	Y	Own UTF5	5	Own CG	2F	H	7.69–8.52	Tim 26452	TO4IA	631	930	c	FD	120 1/2	10 1/2 x3x 1/2	T
161	e.u.s. 6x4 UTO	4R	8500	118	118	40000	13590	9.75/20D	9.75/20	Own 501	6-4 1/2 x5 1/4	501	5.5	375	123–2200	7–3 1/4 x14 1/2	Y	Own UTF5	5	Tim SDD352	2F	H	8.15–9.11	Tim 26452	T4IA	598	907	c	FD	93 1/4	9x3x 1/4	TL
162	e.u.s. 6x4 UTD	4R	8750	139	109	48000	13490	9.75/24D	9.75/24	Own 501	6-4 1/2 x5 1/4	501	5.5	375	123–2200	7–3 1/4 x14 1/2	Y	Own UTF5	5	Tim SDD352	2F	H	8.15–9.11	Tim 27452	T4IA	598	907	c	FD	84 1/4	9x3x 1/4	TL

(7) Autocar—Larger service brake areas on rear axles are provided when tires of 24" base are supplied.
(a) Axle does not include auxiliary axle.

complete: area of brake lining and drum area, do not include auxiliary rear axle.
(d) Models intended for dump or tractor service.

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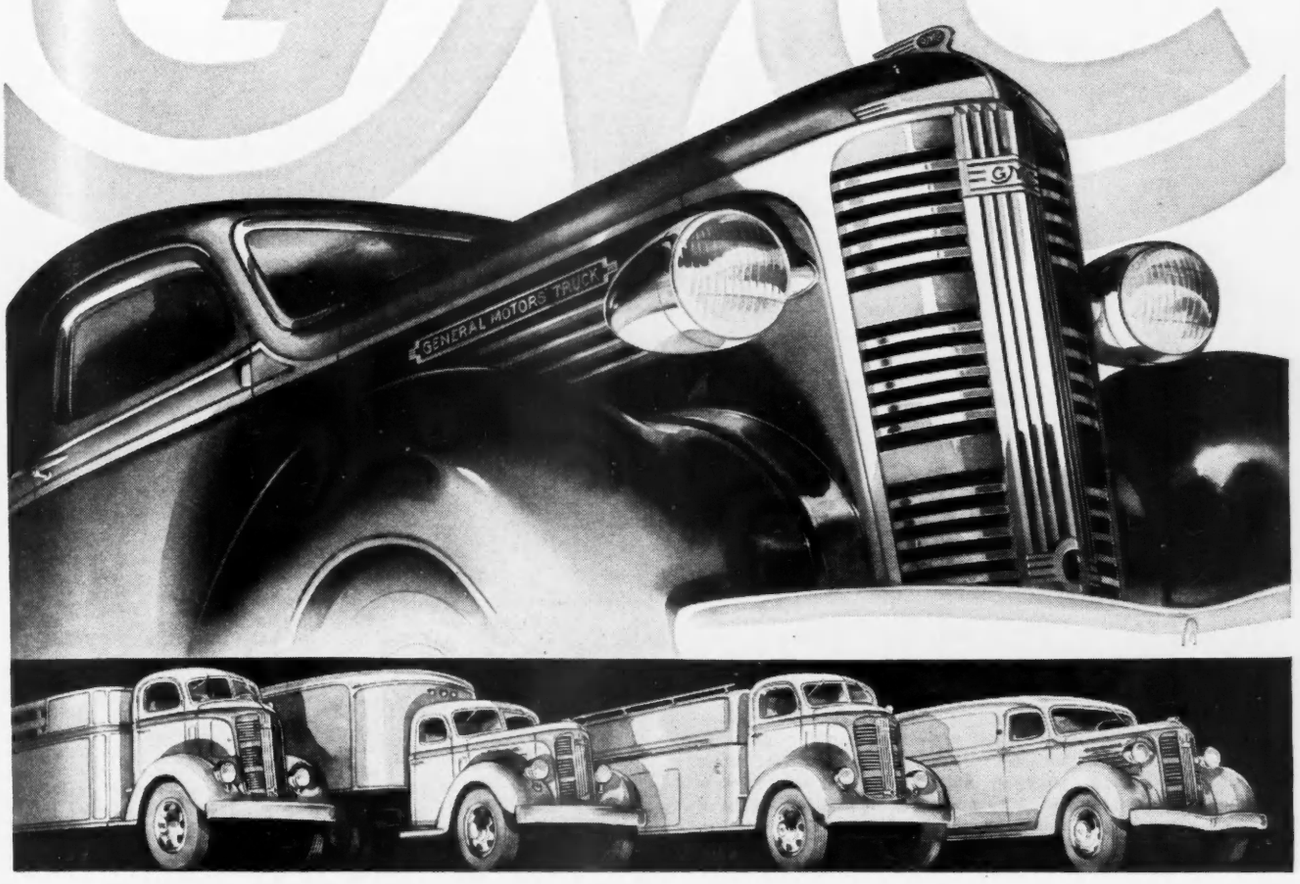

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Monocoque Design for Modern Transportation

(CONTINUED FROM PAGE 37)

upon careful designing to insure that the reactions from the load which originate at the axle and fifth wheel supports are transferred in turn to the cross-bolsters, side sills, side posts and side panels.

Elimination of the chassis is responsible for the marked weight saving effected by monocoque construction. The structural shapes and body panels required by the design are usually slightly heavier than those commonly found in a conventional body, but the extra weight is only a fraction of the weight of a chassis. Being heavier, the side panels are better able to withstand the knocks of loading and accidental impacts.

SINCE the purpose of adopting monocoque construction is to eliminate unnecessary weight, it is natural that it should be associated in trailer design with the use of aluminum alloys. These alloys are particularly well suited to skin-stressed (monocoque) design, not only because of their high strength-weight ratio, but also because aluminum can be employed for side panels in thicknesses sufficient to withstand buckling. The ability of a panel sheet to withstand buckling is governed by its modulus of elasticity and the cube of its thickness. It is not dependent on the tensile strength of the metal. This combination of factors strongly favors the use of aluminum, since the desired stiffness and low weight cannot be attained by heavier metals in spite of their higher moduli of elasticity.

The suitability of aluminum for trucking service is well established and consequently many fleet owners have turned to semi-trailers incorporating both monocoque design and aluminum alloy construction in order to obtain the utmost in weight saving. In Table I is shown the weight saved by an all-aluminum monocoque freight semi-

(TURN TO PAGE 66, PLEASE)

TABLE I

Typical Weight Saving Resulting from Monocoque Construction 27-ft. Freight Semi-Trailer

	(lb.)	(per cent)
A. All-aluminum monocoque of 30,000 lb. capacity:		
Aluminum weight	2,850	
Hardware, paint, rivets, etc.	150	
Axle assembly	800	
Wheels and rims	470	
Tires (4-10.50x20)	630	
Booster, springs, hangers, etc.	700	
Total weight (without landing gear)	5,600	*
Landing gear	600	
Total weight (with landing gear	6,200	
B. Comparable unit all-aluminum body mounted on aluminum semi-trailer of 24,000 lb. capacity:		
Aluminum weight in body	2,300	
Hardware, paint, rivets, etc.	150	
Aluminum in semi-trailer	1,000	
Trailer accessories	3,200	
Total weight (with landing gear)	6,650	
Weight saved by monocoque construction	450	6.78
C. Comparable unit all-aluminum body mounted on steel semi-trailer of 24,000 lb. capacity:		
Aluminum weight	2,300	
Hardware, paint, rivets, etc.	150	
Steel semi-trailer	5,400	
Total weight (with landing gear)	7,850	
Weight saved by monocoque construction	1,650	21.01
D. Comparable unit wood and steel body mounted on steel semi-trailer of 24,000 lb. capacity:		
Body	5,400	
Steel semi-trailer	5,400	
Total weight (with landing gear)	10,800	
Weight saved by aluminized monocoque construction	4,600	42.59

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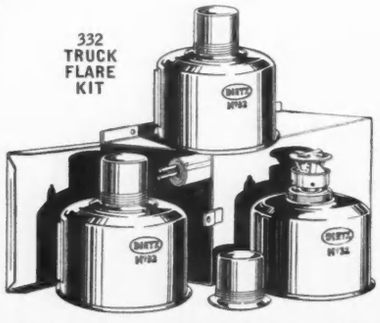

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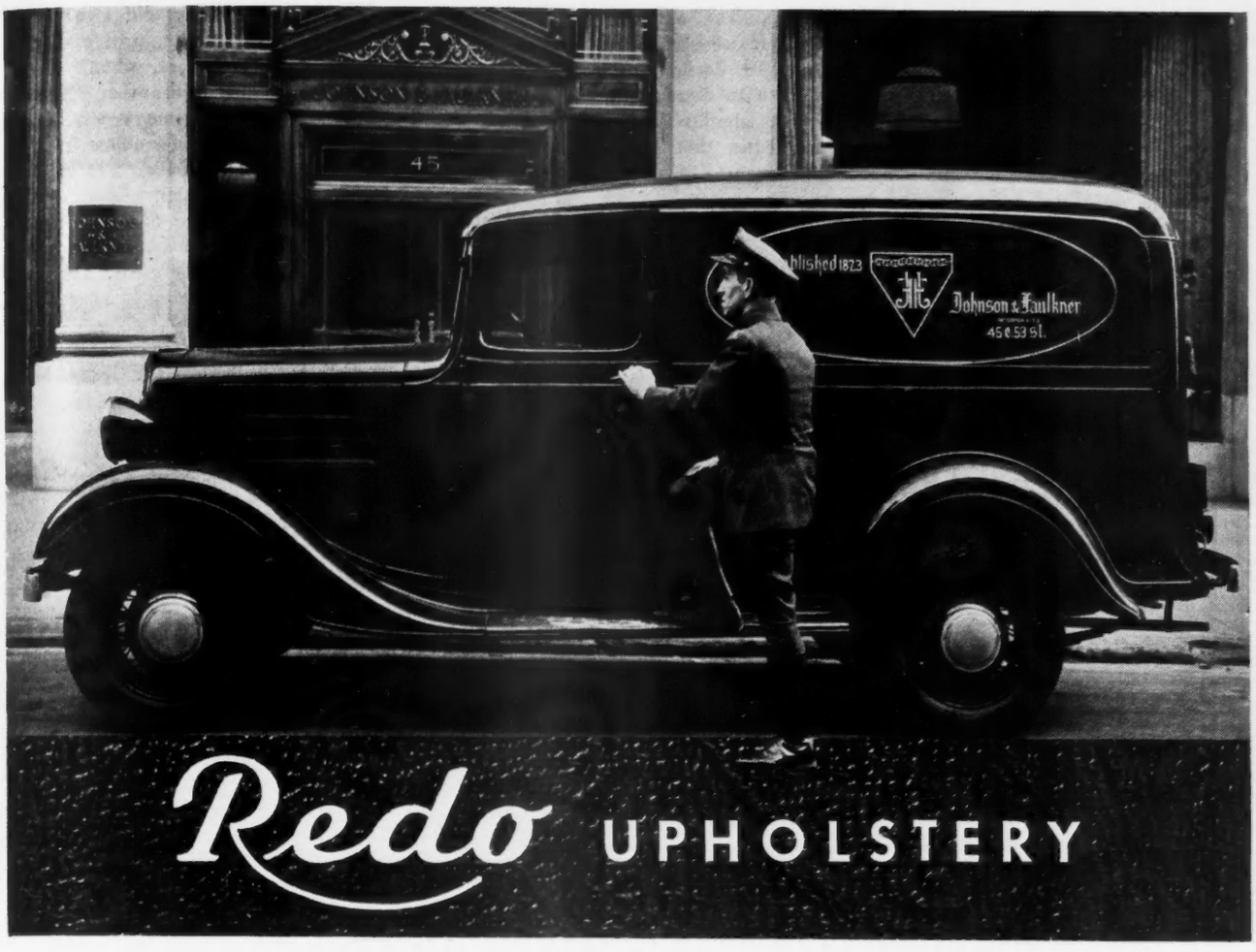

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(CONTINUED FROM PAGE 64)

trailer of 30,000-lb. capacity, in comparison with three other units, namely, an aluminum body mounted on an aluminum semi-trailer, of 24,000-lb. capacity; an aluminum body mounted on a steel semi-trailer, of 24,000-lb. capacity; and a wood-steel body mounted on a steel semi-trailer, of 24,000-lb. capacity. As pointed out in the table, the aluminized monocoque is 42.5 per cent lighter and carries 6,000 lb. more than the conventional wood-steel body on a steel semi-trailer. The weights for units A and D given in Table I were taken from semi-trailers actually built. The weights used for units B and C are accurate estimates based on careful designs, and although these two units were not built, a comparison with similar completed semi-trailers indicates that the weights are representative of actual jobs.

IN spite of the attractive weight saving offered by monocoque construction, fleet owners could not afford to take advantage of it if the cost of such units was not in line with that of other types of semi-trailers. The original cost depends not only on the amount of structural material used and the cost of assembly, but also on the style and size of axle, tires and other accessories. Therefore, when comparing monocoques with other types of semi-trailers, the accessories must be considered. When these items are comparable, and when both types of units are built of the same material, it is found that the price of a monocoque is lower than that of a semi-trailer consisting of body and chassis. The magnitude of this difference in price varies with the size of the trailers. An all-aluminum monocoque similar to A in Table I costs approximately $440 less than an aluminum body with an aluminum chassis similar to B in Table I. If the units were smaller, 18-ft., for example, the monocoque would cost about $200 less than the other. The chief reason for the lower cost of chassisless construction is that it eliminates the expense of structural material and assembling ordinarily required.

COMPARING the cost of units not built of similar materials, such as an all-aluminum monocoque and a semi-trailer composed of aluminum body and steel chassis, it is found that the monocoque generally costs slightly more than the other, but the difference is greatly offset by the lighter weight and larger capacity of the chassisless semi-trailer. In the case of units similar to A and C in Table I, the extra cost of the monocoque is approximately $120 and for 18-ft. units it is about $75. A greater difference in cost exists between an all-aluminum monocoque and a wood-steel body mounted on a steel semi-trailer, but when the saving in weight is used to increase the payload, the extra cost of the monocoque may soon be written off. Again referring to the units in Table I for purposes of illustration, and assuming that each hundred pounds of freight brings in a revenue of $0.001 per mile, it is found that A, which would cost in the neighborhood of $1300 more than D (wood-steel body on steel chassis) and would haul 4600 lb. more payload, will pay for its extra cost in $\frac{\$1300}{46 \times \$0.001}$ or 28,261 revenue miles. Furthermore, when aluminum is employed, the trailer has a scrap value of one-quarter to one-third the original metal cost. *When applying the preceding cost analyses, it should be remembered that the figures, though typical of certain cases, cannot be expected to hold for each individual case. They are included only to give a general idea of comparative costs and should be interpreted with this in mind.*

THE construction problems encountered in assembling monocoque semi-

(TURN TO PAGE 68, PLEASE)

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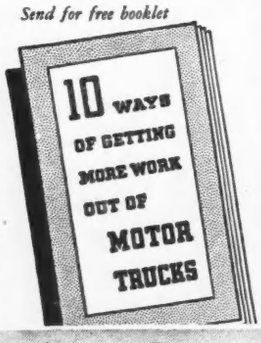

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(CONTINUED FROM PAGE 66)

trailers do not differ fundamentally from those presented by other types of construction. The structural shapes and body panels, while usually somewhat heavier than those employed for a conventional body of equal size, are still well within the range normally handled in the body-building field. The use of extruded aluminum sections often simplifies assembly because of the unique shapes which are available. A roof rail, for example, has been designed especially for truck body construction and provides a top sill for attaching body panels and side posts, a support for drip molding, a footing for carlines, and a curved flange to which roof sheets are attached. A stock casting is used for easy corner construction.

Monocoque construction requires not only a careful design but a design based upon the individual requirements of the service for which the unit is intended. Special formulas are used to determine the design, and although they can be learned by anyone who understands truck and trailer construction, it is generally recommended that this part of the work be done by someone experienced in monocoque design.

Among the many fleet owners now operating all-aluminum monocoque semi-trailers are the Arrow Carrier Corporation, Baltimore Transfer Company, Cargill Warehouse Company, Kroger Grocery & Baking Company, Mason and Dixon Lines, Oakley Express Company, and York Motor Express Company, Inc. Starting with one unit, the Baltimore Transfer Company, which was one of the first to adopt monocoque construction, has steadily increased the number of units until it now operates some 54 all-aluminum monocoque semi-trailers.

TO illustrate the value of weight saving made possible by this type of construction, suppose that the all-aluminum monocoque (A, in the table) operates between two cities 200 miles apart. In comparison with the unit composed of an aluminum body on a steel semi-trailer (C, in the table), the monocoque carries 1650 lb. more freight with an equal gross weight. If the operator receives 60 cents a hundred pounds for the trip, the chassisless unit nets him $9.90 a trip more than the other unit, with no increase in operating expense. In fact, if the units make the return trip empty, the operating cost of the monocoque is less. Not many trips are required to pay for the extra cost of the all-aluminum monocoque, and after that a high return on the added investment is realized. These results are typical of the experience of operators of such units.

Although the monocoque principle has found its greatest application in semi-trailers, it offers definite advantages to operators of trucks and four-wheel trailers. The cost of designing monocoque trucks for each individual job has hampered progress, but it is expected that eventually they will be available. In the tank-truck and trailer field, the advantages of this type of construction are also recognized. Many chassisless units are already in service and, although they employ internal bracing to some extent, they indicate that the trend is toward true monocoque construction. Among the advantages of a chassisless design are a lower center of gravity and the possibility of using a larger capacity tank without exceeding the legal height. A substantial weight reduction is also obtained, but it could be increased by employing monocoque construction. Considering the short time this principle has been utilized in highway transportation, it has made remarkable progress, and as the advantages of monocoque design become more generlly known, it will undoubtedly grow to be one of the principal types of construction.

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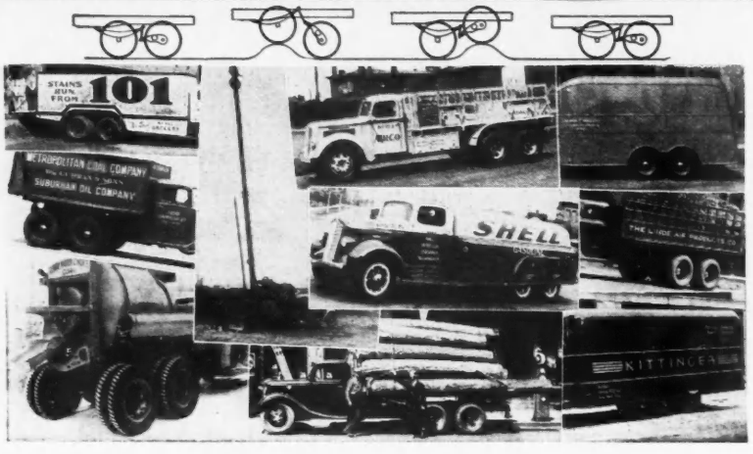

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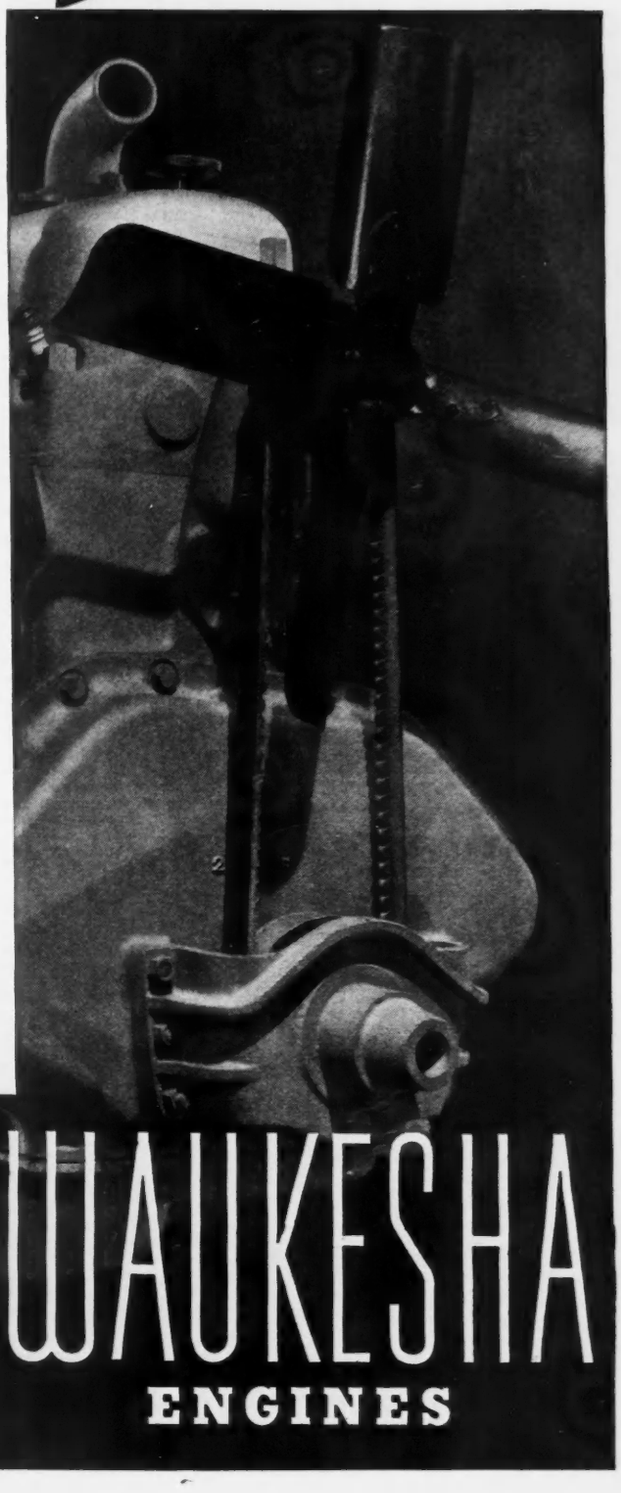

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Chevrolet 1937 Line

(CONTINUED FROM PAGE 39)

1½-ton truck frame has a new, stronger second cross-member, and a change in taper of the side rails, making possible improved body mounting, and a better condition for the attachment of the second cross-member.

Springing, also, has been changed on all models. The new front springs have the berlin-type rear eyes, which are wrapped by the second leaves. Front-spring slope has been eliminated to effect improved steering geometry. All rebound clips on the 1½-ton truck are of the bolt type, replacing the clinch type. This new clip is not only considerably stronger than the one previously used, but it also retains its shape throughout the life of the truck, even under heavy loads, thus maintaining the alignment of the spring leaves at all times.

In the commercial car models the rear axles are virtually unchanged, except for the increase in length in the housing and drive shafts, to give the wider rear tread. The rear axle of the 1½-ton model has a new housing of the one-piece, seamless steel type, which replaces the former malleable iron housing with seamless steel tubes. The new rear axle has improved differential case mounting and new rear wheel hub.

The 1½-ton models have a stronger rear axle shaft, also. By revising the heat treatment, the strength of the shaft is increased more than 40 per cent. This strength is measured by the number of cycles the shaft can withstand in the stroking machine test. In this test, the torsional load is reversed with each full stroke of the machine.

The Chevrolet design of hydraulic brakes is retained in both lines. In the commercial car, the hand brake mechanical linkage is new, with simplified adjustment. It utilizes flexible cables to actuate both brake shoes in each rear wheel.

The hydraulic piping layout is improved by rearranging the piping and flexible tubing to prevent air pockets and bends, and at the same time to avoid excess heat from the engine and exhaust. At the front of the chassis, the piping passes through holes in the side member webs, rather than over the top of the flanges.

Besides the improvement in steering geometry gained by the new front springs, the 1937 models have a sturdier steering gear mechanism with a higher gear ratio. The worm is underslung, so that it operates in a bath of oil; the sector is straddle mounted.

Fuel supply is from an 18-gal. tank equipped with a special vent which exhausts fumes outside the cab or body. A cork ring float prevents any chance of fuel escape through this tube.

In cab models of the commercial cars and 1½-ton trucks, together with the panel and express body types of the latter, the tank is located under the driver's seat. The seat cushion in the cab models is divided, so that the driver need not get out when the tank is to be refueled, the filler being at the right side of the cab. In the commercial body types, without cabs, a 16-gal. fuel tank is mounted at the right side of the chassis between the second and third cross-members.

A DESCRIPTION of the bodies for the two series follows: Commercial cars—panel, canopy express, pickup (with cab), and suburban carryall.

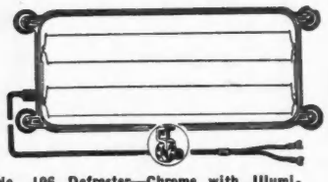
The new panel has an overall length of 138¼ in. The load platform has been increased to 86 13/16 in. A large, recessed advertising panel is provided on each side of the body.

The new canopy express has improved appearance through its steel construction, larger windshield for better visibility, more easily operated door windows, improved weight distribution, and larger load space.

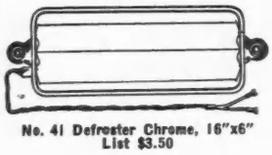
(TURN TO PAGE 76, PLEASE)

"It's Dangerous When Wires Are Down"

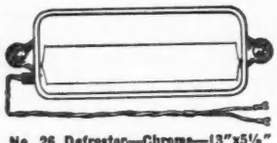
No. 51—DeLuxe Chrome with Illuminated Switch 18"x7"—$6.00 List



No. 196 Defroster—Chrome with Illuminated Switch 16"x7", List $5.00



No. 41 Defroster Chrome, 16"x6" List $3.50



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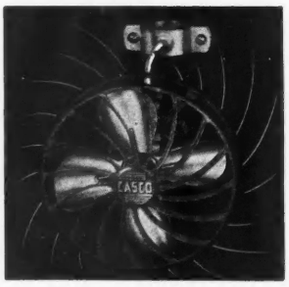
"We must move fast, and it's always in the worst weather All of our trucks and service cars are equipped with CASCO Electric Defrosters for clear vision and safe driving thru the most severe storms. When wires are down, it's dangerous. We must get there quickly and surely."

So quotes a typical Utility Company. They selected CASCO glass-type electric defrosters because they prove *absolutely dependable* under all conditions. They positively remove ice and sleet from the windshield.

Equip every truck, bus, or passenger car in your fleet with CASCOS *now*. When sleet storms strike, have them ready for instant use, for clear vision, safe driving, no delays, no driver fatigue. CASCO performance is assured by eight years of service and millions of satisfied users. Insist on CASCO Electric Defrosters for your fleet.



CASCO AUTO FANS

Keep frost off inside of windshield in winter when used in conjunction with efficient heaters. Attach to steering post or on header board. Has an efficient, dependable motor, sturdy fan and attractively designed guard.

No. 35 DeLuxe Model $3.75 list
No. 36 Standard Model $3.50 list

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Also Casco Illuminated Switches for Defrosters and Hot Water Heaters, Fender Guides, Cigar Lighters, etc.

A NEW Edison SPARK PLUG

Only **Edison** *has this Built-In Leak-Proof Gasket*

...that makes light of the heaviest duty

Edison has scooped the field with an improved spark plug that is an engineering triumph. Translated into terms of dollars and cents, this great spark plug will mean real economies in fleet operating costs, for its improved performance will reduce maintenance expense and "time out for repairs".

Case histories in our files prove that Edison Spark Plugs have out-performed and out-lived the best of competitive products.

Correct spark plug design is essential to the efficient performance of modern engines. Edison has gone one step beyond the perfection of the spark plug itself by providing a built-in leak-proof gasket that assures a compression-tight seal between that plug and the engine block. By insuring a correct, concentric fit, this new gasket eliminates compression losses — reduces spark plug replacements. It is a distinctive design that is the newest evidence of progressive Edison engineering.

Try a set of Edisons. Compare the cost per plug—and the cost per mile. *If your jobber doesn't stock them write to us, today.*

EDISON-SPLITDORF CORPORATION · West Orange, New Jersey

ONE OF THE Thomas A Edison INDUSTRIES

(CONTINUED FROM PAGE 74)

The new pickup (with cab) has a longer steel body, increasing cubic capacity by eight per cent. An extra bolt is added on each side for attaching the front end panel to the side panel to prevent any possible distortion of the front end panel, even under abuse. Rust proofing of the body is assured by dip, rather than spray painting.

The new carryall suburban, suitable for either passenger or cargo transportation, has an interior that is both longer and wider than last year's.

The 1½-ton truck line includes: panel, canopy express, pickup, stake, stake express, and stock rack.

The new panel has an all-steel body structure throughout, and a smart, streamlined appearance. Eight steel crossbows give extra strength to the longer top.

The new canopy express is similar to the panel body, except for the partition back of the driver's seat and the openings in the sides and rear.

The new pickup has improved payload and weight distribution, due to the relocation of the power plant. Smarter appearance and greater strength are gained through more streamlined sheet metal, and use of steel construction.

The new stake is available in either the 131½-in. or 157-in. wheelbase with 9-ft. and 12-ft. body lengths, respectively. The stake sides are firmly aligned in durable stake pockets. Improved load distribution has been effected in this model. The side stakes remain in true line even when the rear gate is left off.

The new stake express is available in the 157-in. wheelbase.

The new stock rack, on the 157½-in. wheelbase, also has completely improved load distribution. An important new feature is a stock entrance gate that slides horizontally, instead of vertically, as in last year's model. The interior is free from obstructions and the bottom slat is high enough to keep small animals from injuring their legs.

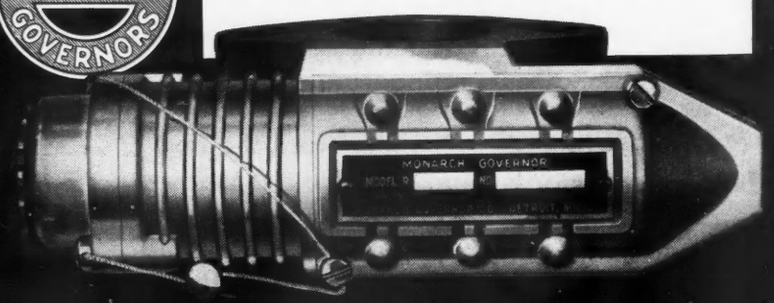
In addition, two commercial cars are offered on the 1937 Master passenger car chassis. These are the streamlined sedan delivery body, all-steel in construction including the top, and the coupe pickup, which is a regular coupe passenger model, carrying a steel pickup box mounted in the rear deck compartment and extended to form a platform 66⅛ in. long between the front partition and the tail gate.

● WHAT YOU CAN EXPECT FROM MONARCH GOVERNORS

Long, trouble-free operation instead of long tie-ups . . . service instead of servicing . . . experience instead of experiment . . . these are the things that fleet operators expect—and get from MONARCH GOVERNORS . . . for MONARCH'S exclusive vacuum principle and superior construction mean consistent, superior performance . . . and they also mean that the original cost is usually the last cost for this essential equipment.

MONARCH GOVERNOR CO., DETROIT

MONARCH SINCE 1913 GOVERNORS



"Supervised Transportation"

White Lists New 1½-Ton

(CONTINUED FROM PAGE 44)

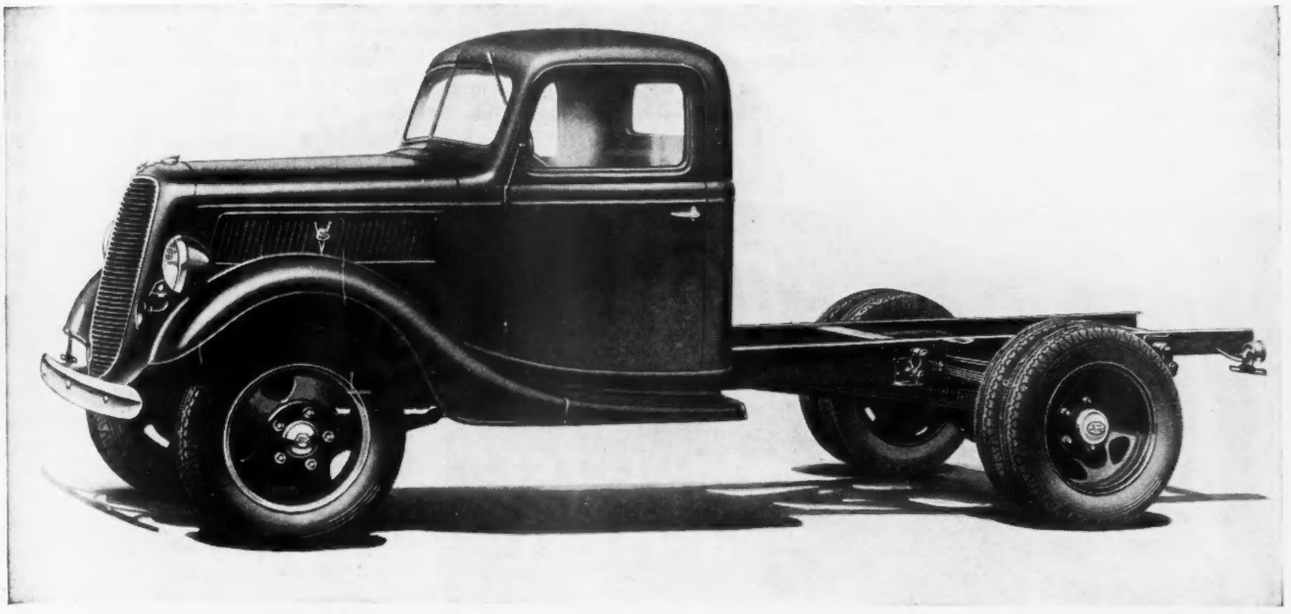
down draft type, properly proportioned to suit the engine, further enhances fuel economy by means of a hot spot, automatically controlled, which maintains the mixture in the manifold in a vaporized state, thus permitting the most economical combustion of the fuel charge.

Evidence of the strength built into the new line is found in the frame which is almost 8 in. in depth with a 3 in. flange. A new design rear axle, with a straddle mounted pinion and chrome-nickle alloy gears, is basically similar to the White full floating axles which have done heavy-duty service in larger capacity trucks.

Styled by Count Alexis de Sakhnoffsky, the new streamlined Model 700 will offer a choice of five different wheelbases, ranging from 136 in. to 196 in. The 700K tractor will be furnished in two wheelbases, 136 in. and 148 in. Safety features outstanding on the new jobs will be adequate four-wheel hydraulic brakes having 270 sq. in. of lining area, an adequate motor of 70 hp. developing 165 lb. ft. torque, proper chassis weight to incorporate ruggedness of design, automatic air-ventilated cabs, thickly-insulated floor boards permitting a clean, fume-proof cab the year around, and a twin lever steering gear which increases maneuverability and parking ease.

FORD SHOWS THE WAY

TO LOWER TRUCKING COSTS



NEW ECONOMY... NEW STYLE... CHOICE OF

TWO V·8 ENGINES

IN THE NEW 1937

FORD V·8 TRUCKS

AND COMMERCIAL CARS

Ford sets the pace in hauling and delivery economy! Two V-8 engine sizes give you a choice of power to fit your own individual needs. The improved 85-horsepower V-8 engine assures economy for heavy-duty service. The new 60-horsepower V-8 engine sets an entirely new standard in the light delivery field. It will pay you to get the facts about this Specialized Transportation.

In addition to the most advanced style in truck design, Ford introduces many new features that assure lower operating cost and longer life. These are added to the many tried and tested features which have won the enthusiastic approval of Ford owners for years. Ask your Ford dealer for an "on-the-job" test—with your own load, under your own operating conditions.

Ford

MATCHING THE HIGHEST IN QUALITY . . . SELLING WITH THE LOWEST IN PRICE

Dope On Diesels

(CONTINUED FROM PAGE 35)

average some 40 to 60 per cent better fuel mileage than a corresponding gasoline engine. At the same time, tests in bus service of a direct injection engine compared with basically the same engine with precombustion chamber design and operating in the same bus chassis showed a definite difference in fuel economy in favor of the former. It would appear that competition between various diesel engine builders must eventually be on a basis of the relative economy of one type engine versus another rather than diesel versus gasoline.

Spark ignition fuel oil engines seem to be on the wane in Europe. In the United States, the reverse would appear to be true. Two important manufacturers have been marketing a spark ignition engine for some time, and from all reports the popularity of this engine is increasing. Some other manufacturers have stated that they are working on the development of this type of engine. It is claimed that their chief advantage is in being able to use a wide range of low-priced fuels. On the other hand, fuel economies are not as good as obtained with the diesel, although better than carburetted engines.

There exists a strong desire on the part of both European and American builders to get away from the use of "glow plugs" for starting cold engines, chiefly because of service troubles encountered in the field. Definite progress is being made on improving starting, and various builders recounted data showing that the diesel engine could be started at temperatures as low as —15°F. without any axiliary heat. At least one European builder intends to use an electrically heated grid in the air stream to the manifold, and accomplish the starting by spraying the regular diesel fuel into this grid during the starting period, thus heating the fuel and vaporizing it prior to getting it into the combustion chamber.

Engine Speed

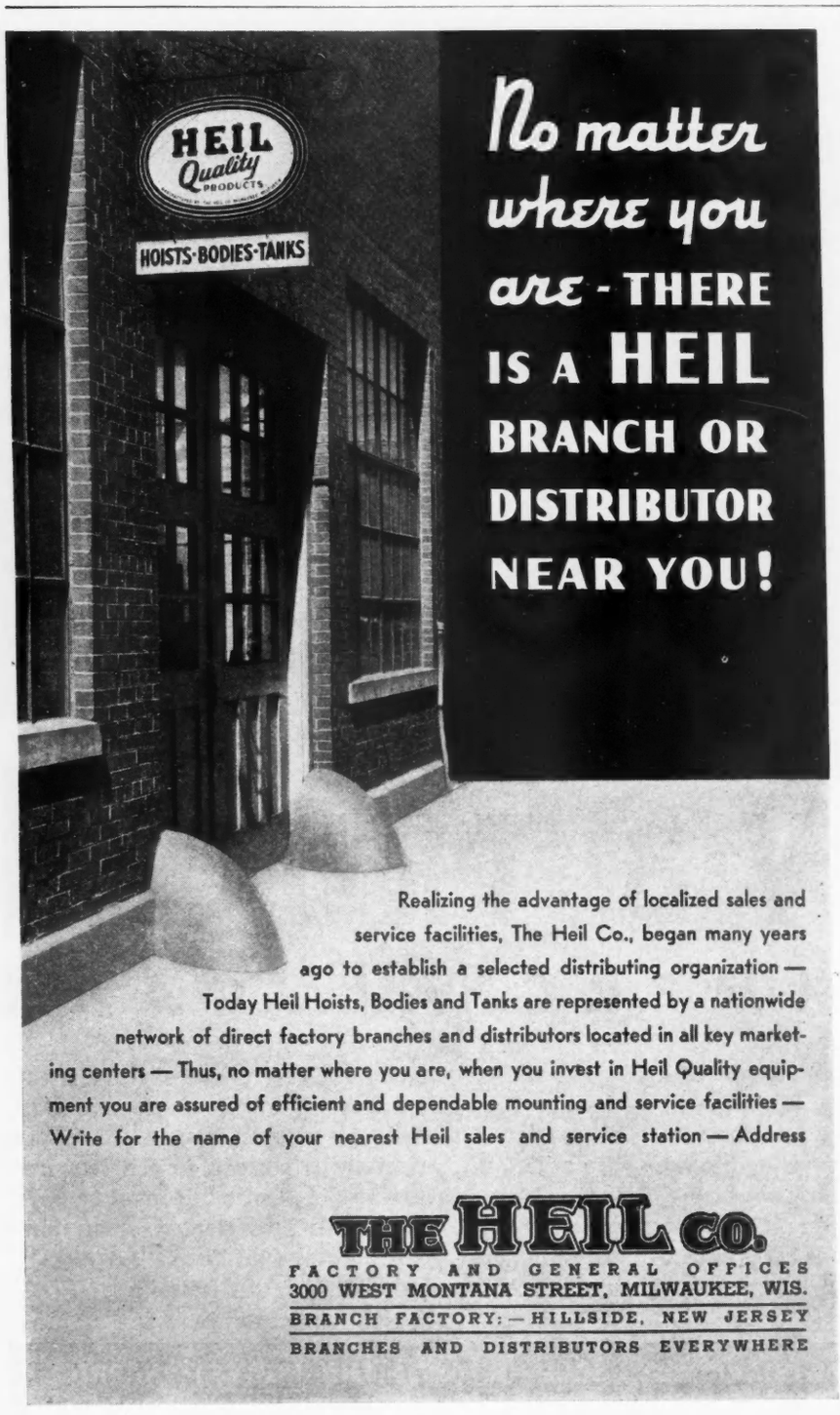
AT least two German manufacturers are contemplating speeds as high as 3500 and 4000 rpm. in the smaller engines intended for light commercial vehicles, taxicabs and small tractors. For the larger size engines, speeds in the 2000-2400 rpm. range seem pretty well fixed for the present. In the United States, engines in bus service are currently running from about 1750 to 2200 rpm., with a tendency to standardize at a speed nearer the lower of these two figures.

The opinions of American manufacturers on this point are widely divergent. Those companies building engines in the low speed range (under 1200 rpm.) are definitely increasing speeds or anticipate doing so. The companies building engines in the 1600-2200 rpm. range seem to feel that this is the upper limit compatible with reasonable maintenance costs and long life, and that in the long run the commercial truck and bus engine will level off within this range. The third group, consisting principally of builders already running over 2200 rpm., are definitely of the opinion that the best method of obtaining the required horse power is by increasing engine speeds rather than increasing engine size, and are convinced that the small engine running at speeds of 3000 rpm. or higher are coming in the near future.

Fuels

IT appears to be the concensus of both operators and manufacturers that satisfactory fuels are now available. Many of these same people, at least those in this country, were not long ago bitterly bewailing the lack of suitable fuels for their engines. As a matter of fact, a great many of the American manufacturers interviewed stated that when fuels of excessive ignition quality

(TURN TO PAGE 80, PLEASE)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No matter where you are - THERE IS A HEIL BRANCH OR DISTRIBUTOR NEAR YOU!
Realizing the advantage of localized sales and service facilities, The Heil Co., began many years ago to establish a selected distributing organization — Today Heil Hoists, Bodies and Tanks are represented by a nationwide network of direct factory branches and distributors located in all key marketing centers — Thus, no matter where you are, when you invest in Heil Quality equipment you are assured of efficient and dependable mounting and service facilities — Write for the name of your nearest Heil sales and service station — Address
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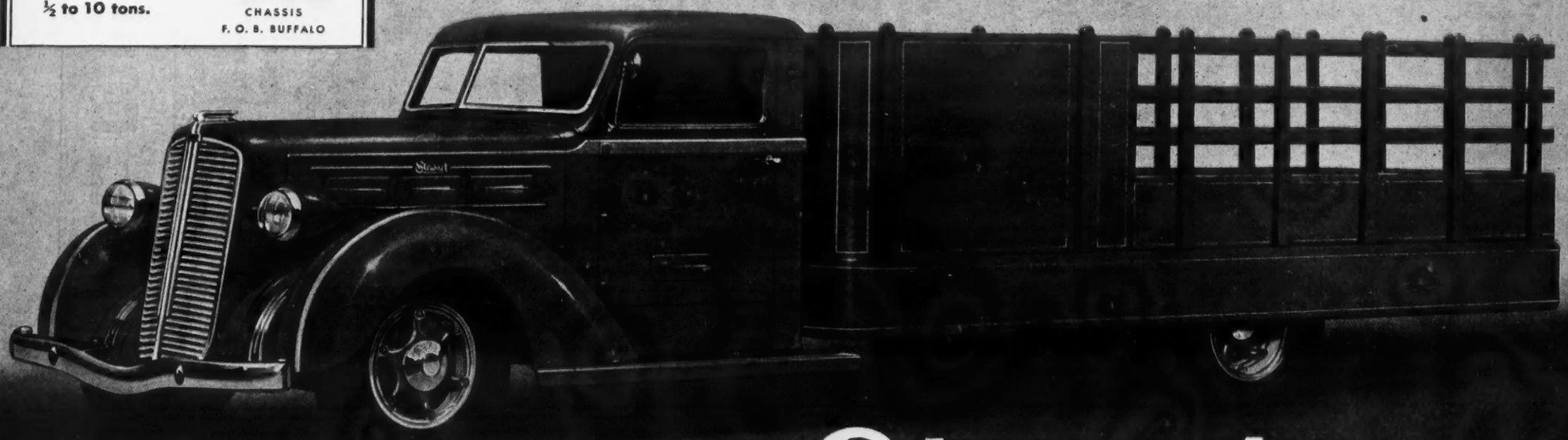
Style WITH DEPENDABILITY

The new 1½-ton 1937 Stewarts offer something really new—beauty of design backed by dependability. Added to the Stewart time-proven mechanical features are many new improvements—better load distribution—accessibility of working parts for quick adjustment—more power and greater gasoline economy. ★ ★ At last, a big roomy modern cab—wide adjustable seat—ample leg-room—double cowl and door ventilators—narrow corner posts—better driver vision—real passenger car comfort. ★ ★ The new 1937 Stewarts are built for tough service and styled to sell. Stewarts for 24 years have earned a world wide reputation for long life, economical service—"Stewart Trucks Have Won By Costing Less To Run". Today Stewart's advanced styling teams up with this low cost dependability. ★ ★ Dealers! Our franchise requirements are liberal. Write or wire for details.

STEWART MOTOR CORPORATION, BUFFALO, N. Y.

THE NEW 1937
1½ TON STEWART
Other models from $495 up. Capacities ½ to 10 tons.
$645 CHASSIS F. O. B. BUFFALO



Stewart
MOTOR TRUCKS

(CONTINUED FROM PAGE 78)

were used, improvement in power and economy did not necessarily result.

Some American builders seem to be opposing improvement in ignition quality because of the desire to combat the growing popular impression that the high-speed diesel engine does not retain the characteristics fundamental to the diesel of being able to use a wide range of fuel quality successfully. As a matter of fact, however, fuels of high ignition quality often, though not necessarily markedly, improve the power and economy of a high-speed diesel engine as has been demonstrated at our laboratories by tests on a wide range of fuels. It seems likely that improving ignition quality of diesel fuels can result in better power and economy, if the design of the engine and the way it is adjusted are such that the latent possibilities of the better fuel can be realized.

Another interesting point on this question is the "driver reaction" to fuels of different ignition quality. Tests made in actual service with a truck powered by a diesel engine and adjusted according to factory recommendations found the drivers unanimous in their preference for fuels having ignition quality well in excess of the minimum octane number recommended by the manufacturer. They noticed particularly the decrease in roughness, the greater flexibility and acceleration, and much easier starting. These tests were run "blind" and such practical observations cannot be overlooked in considering ignition quality.

Exhaust odors from diesels are not generally considered serious either in Europe or America. It is true that there is a characteristic odor permeating the atmosphere in the immediate vicinity of a diesel but this is not more unpleasant than the odor encountered on many commercial gasoline vehicles.

On the question of smoke, it is believed that this invariably is the result of overloading. On the Pacific Coast where diesels seem to have a bad reputation for smoking, it has been demonstrated that if the engines are adjusted according to factory recommendations, the smoke largely disappears, but at the expense of some power.

Operators there stated that they preferred the extra power obtained under smoking conditions to the elimination of the smoke. Manufacturers, of course, attempt for the most part to govern their engines below the smoke point but this is no assurance that operators will not change the fuel pump, provided there are not ordinances against smoke nuisance. In all probability, the smoke problem could largely be eliminated by a more conservative policy on rating engines, and by refraining from recommending a small engine for a job which should logically require an engine of higher power. Here then is another argument favoring an increase in the engine speeds. If operators insist upon greater power, and the amount of room under the hood is limited as it is, the logical solution would seem to point toward a higher speed engine. From our observations, European engine builders are more conservative than the American builders in rating their engines, and set their governors at a point where it is almost impossible to obtain more than about 90 per cent of full load regardless of how low the engine is lugged. In Europe, of all the hundreds of diesels seen operating in all kinds of service, the writer did not witness a single case of excessive smoking.

Lubrication

RING sticking difficulties are encountered in Europe, but much more frequent maintenance checks appear to minimize such problems, compared to American operation. Some operators are cleaning pistons and rings at 12,000

(TURN TO PAGE 84, PLEASE)

New Governors For Old Ones

To make it easy for every fleet owner to enjoy the sweeping and exclusive benefits of the new Handy Vari-Speed Governor, we announce a nation-wide Governor Exchange Program.

Any make of used governor will be accepted on an extremely liberal exchange basis.

Here is your chance to equip your fleet with this revolutionary new Handy, the Governor you've dreamed about, at absolutely minimum cost.

Remember, every Handy Vari-Speed covers full speed range with one adjustment—seals, locks, or adjusts and locks, if desired, from the dash—includes patent-protected features of stability and accuracy—is the only Governor built under the supervision of Arthur A. Bull, world's leading pioneer and expert in Governor engineering.

Ask your Handy Distributor about the Governor Exchange plan, for one governor or a thousand. Do so right away!

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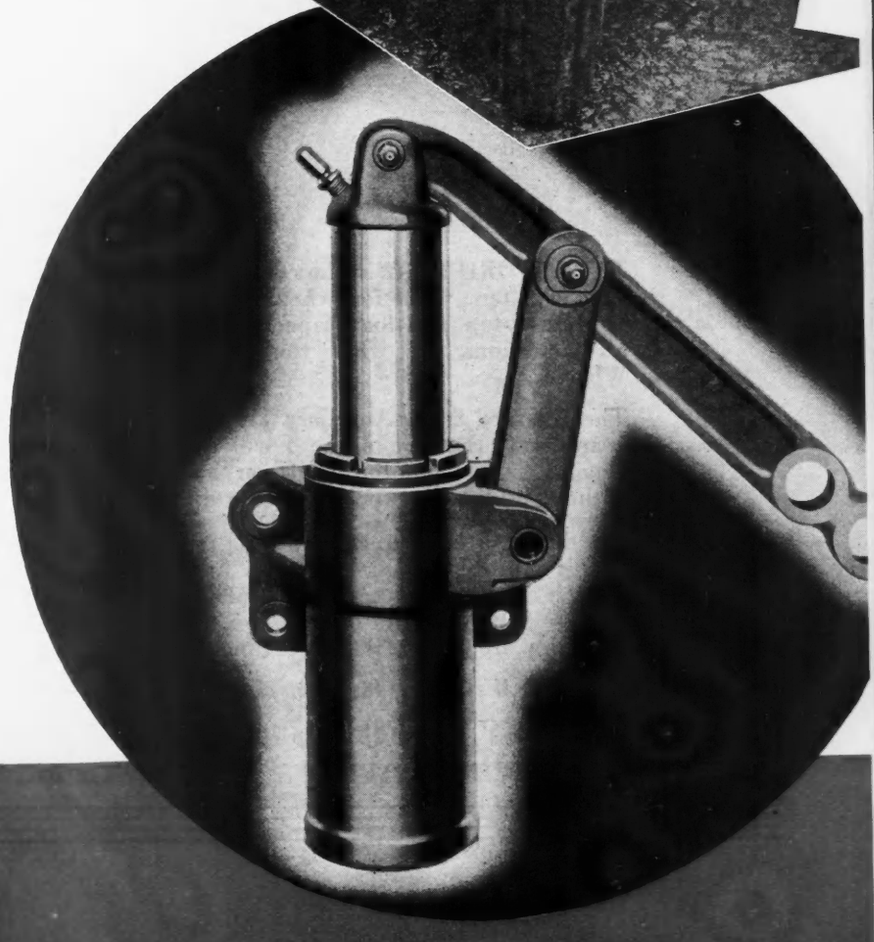
Shock Eliminators

It Takes AIR to Provide Shock Elimination!

We announce an Air Suspension Unit designed for installation in conjunction with the rear steel springs of trucks, busses, and tractors, and on commercial trailers. Performing three functions — air suspension, shock elimination, and snubbing—Cle-Air Units insure maintenance of schedules, safety, and comfort for all types of commercial motor vehicles. Whether a fleet owner or the operator of a single truck or bus, you will want to know more about CLE-AIR Air Suspension Units, and what they will do for you. Bulletin 1236A on request.



The Cleveland Pneumatic Tool Company

Automotive-Aircraft Division

3734 East 78th Street

CLEVELAND, OHIO

(CONTINUED FROM PAGE 80)
mile intervals as a routine procedure, whereas others are currently running 50,000 miles before overhaul, and there were cases where engines were operating 120,000 miles and even 180,000 miles before pistons were removed for any reason. It is believed that definitely more severe conditions existing in America may have exaggerated the ring sticking problem compared with European experience, and in the past year, very marked improvement has been accomplished in American road vehicles in overcoming this problem. Present day American engines on test can now run on overload conditions from five to eight times longer without a ring sticking than their earlier predecessors, which means that in regular service their life has been increased many fold. It is generally agreed that the basic reason for ring sticking is in overloading of engines, and further, that the problem is basically one of design rather than lubrication. By proper design, piston ring zone temperatures can be reduced to a point where ring sticking is largely eliminated. At least that is the prevailing feeling among the engine builders, and they feel that in large measure this has been accomplished.

Most of the road vehicle diesel engines are equipped with some one of the new alloy bearings both here and in Europe. These bearings seem to be giving an excellent account of themselves, and remarkably little bearing trouble is being encountered in field service, either due to corrosion, or to burning out of the bearings. One European builder is using duraluminum successfully in the bottom half of the big end bearing. Several builders both here and abroad are experimenting with chromium plating of shafts, with the principle problem being to get a uniform thickness of plate.

IT is interesting to note that both in Europe and in America, the manufacturers recommendations in regard to viscosity are favoring the lighter grades of oil even for the large size engine. In no case does a manufacturer recommend anything heavier than SAE 40 or its equivalent, and the average is closer to SAE 30. In a few cases manufacturers recommend the 50 grade either for very hot weather, or in the case of well worn engines.

Prominent European manufacturers who build both gasoline and diesel engines agree that at present maintenance costs for the diesel are certainly not higher, and are in many cases lower than for gasoline engines. This is also indicated by the experience of important operators. It was pointed out that although a given part usually costs more to replace on the diesel, that part generally lasts sufficiently longer to make the over-all maintenance costs slightly less than for the gasoline engine. In America experience of both builders and operators, particularly during the past year, would seem to show that the diesel can be at least equal to the gasoline engine in cost of upkeep, although there are some cases where this has not been achieved. It would appear that successful diesel maintenance today is more a matter of having trained personnel than of engine selection. On the whole, higher maintenance should no longer be recognized as a characteristic of the diesel versus the gasoline engine, either here or abroad.

ONE point emphasized by American builders, and rarely mentioned by the European manufacturers, was the pressing necessity to develop quieter running engines. This is not due to any inherent greater quietness of the European engines, but rather to the demand of the American operators for an engine which is as quiet as the gasoline engine. European operators take a more lenient position on this and accept the greater noise of the diesel as inevitable.

● MORE TONS

● MORE MILES

● LESS COST

WITH WARFORDS

WARFORD Ten-Wheelers drive with eight wheels; brake with ten. Traction when you must go, braking when you must stop, and load capacity at low mile-charge under all conditions, are what you get in the Warford Ten Wheeler.

The Warford Super-Auxiliary Transmission gives you extra gear ratios that make the Ford V-8 Heavy Duty Truck Engine handle ten ton loads on all grades and footings without undue overwork.

Yet the investment to get all these money-saving benefits is well in proportion. You will find that Warford Ten Wheelers last so long, require so little attention and consume so little fuel and oil that the saving or profit (whichever you are after) is an excellent return on the outlay.

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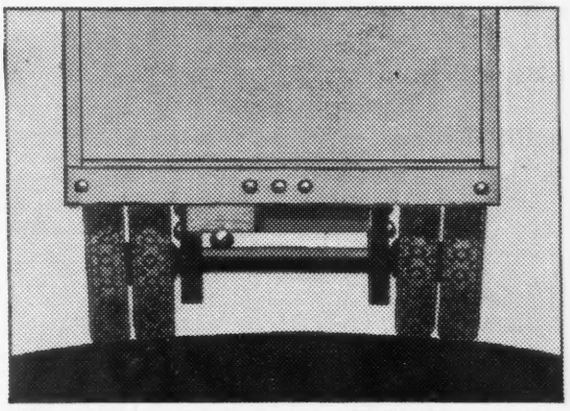
THE WARFORD CORPORATION
44 WHITEHALL STREET NEW YORK, N. Y.

SAVE MONEY BY SWITCHING TO THIS ULTRA MODERN AXLE TODAY

When your ordinary trailer axles fail in service why invite the same condition to repeat itself by replacing them with old type equipment? Conventional axles with integral wheels cost haulers huge sums in early tire wear and gasoline loss. But the modern Detroit Compensating Axle will more than pay for itself in tire and gasoline savings. In the long run it doesn't cost you a dime. Here are the reasons:

1. The design of this axle provides an automatic camber which insures each tire having full and square contact on any normal road crown.

2. Free rotation of the differential wheels prevents tire drag or scuffing. This also means less draw-bar pull, resulting in marked gasoline savings.



Illustrating how the automatic camber fits the road crown

Each time this ultra modern axle travels approximately 150,000 miles it saves at least *2 sets of tires.* It has then *more* than paid for itself, and after that still continues to earn substantial profits.

For complete information write or wire the

DETROIT **COMPENSATING** AXLE CORP.

Compensating Axles and Differential Wheels

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Money Makers — *Continued*

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110B Install HOOF Dash-Control Governors and govern your fleet operations with safety. See page 110. Check the post card for further information.

110C KINNEAR Truck Doors, which roll up like a window-shade, are never in the way. See page 110. Check the post card for further information.

110D The new ALCO 4-Wheel Drive for Fords and Chevrolets offers novel performance features. Turn to page 110. Check the post card for information.

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111A Read about ARMORPLY, the panel material faced with rust-resisting steel, on page 111.

111B HUG trucks are famous as the trucks that are built to meet the conditions. See page 111. Then check the card for HUG truck specifications.

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111E The ROBINSON Universal Coupling Holder supports the hose and seals it from dirt; the ROBINSON Autovac Coupler is open when connected, tightly closed when disconnected. See page 111. Check the post card for details.

111F There's half a century of glass-making behind each clear piece of DUPLATE Safety Glass. See page 111, and check the post card for more information.

111G Think of polar bear ice traction and you'll think to specify CLAW Double Duty Truck Chains. See page 111, and check the post card for particulars.

112A Clutch ills, such as clashing gears, jerky starting, vibration, and clutch chattering can be corrected with the OHIO FLEXON Clutch Plate. See page 112, and check the post card for details.

112B Fleet operators who buy EDWARDS Quality Semi-Trailers come back for more. See page 112. Check the post card for information.

112C Read on page 112 about MOTOR METAL MFG. CO.'s extensive line of Fenders, Hoods, and Stampings. Check post card for further information.

113A For uniformly accurate valve seat grinding jobs you need a HALL ECCENTRIC Valve Seat Grinder. Read page 113, and check the post card for details.

113B Now arc welding demands, both small and large, are met with one welding machine, the new LINCOLN Welder. See page 113, and check the post card for information.

114A New manufacturing, better materials, and exact tolerances are features of the complete WEATHERHEAD line of ARMATURES for cars and trucks. See page 114, and check the post card for details.

114B Winter accumulations of rust and sludge in fleet radiators vanish with SANI-FLUSH. Try the sample offered on page 114. Check the post card for information.

114C Turn to page 114 and read about the GRAMM Four Wheel Trailer with Stiff Tongue Dolly. Check the post card for further information.

114D You don't have to buy new chains when cross links start to go—repair with MONKEY LINKS. See page 114 for free offer. Check post card for details.

115A Turn to page 115, and see one type of the KINGHAM TRAILERS which will help your fleet keep a trip ahead. Check the post card for further details.

115B Be sure of safety law compliance; apply K-D Safety Lighting Equipment. See page 115. Check the post card for further information.

115C Now you can get the genuine BRAD FOOTE Gears, so popular for bus replacements, for your trucks. Turn to page 115. Check post card for details.

115D With LATHAN Besler Power Brakes, you get graduated, self-compensating "Locomotive Control" for your trailers. See page 115, and check the post card for more details.

115E Body and fender dents can be built up into money for you with the SIOUX Metal Spray Gun. See page 115. Check the post card for more information.

116 On page 116 SHULER announces a real Axle engineered for House Trailers. Check the post card for further particulars.

117 The makers of A.C.F. buses use LONG CLUTCHES to withstand continuous stop-and-go clutch wear. See page 117, and check the post card for details.

118 Outstanding in the spray painting and finishing equipment developed by DEVILBISS is Exhaust Equipment to meet any need. Turn to page 118, and check the post card for details.

Economy Packages for Fleets

(CONTINUED FROM PAGE 25)

by a special name plate on the instrument panel which states that the "Performance and speed of this vehicle has been curtailed to obtain lower operating cost." Special engine tune-up specifications are listed on a plate attached to the rocker arm cover.

As applied to the 1937 Chevrolets the variations in the engine include a special carburetor, the main venturi of which is 1 1/16-in. diameter instead of the 1¼-in. main venturi that is used in regular production. The main jet is smaller, 0.0835 in. in diameter instead of 0.094 in. for the standard setting; and a special metering rod is used to bring the calibration to the most efficient point at the various speeds and loads under which these cars are driven.

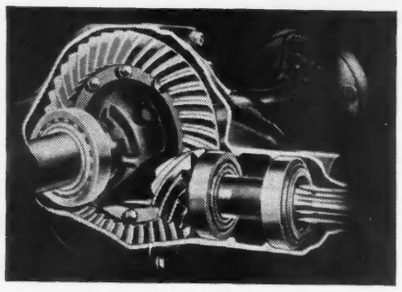
There is also provided on the carburetor a special throttle lever that engages a stop pin when the throttle is half open, limiting the amount of gasoline mixture that can be drawn into the engine when accelerator is pressed to the floorboard. In this way a marked saving in fuel is made, because the mixture ratio at wide-open throttle is usually 15 to 20 per cent richer than at corresponding speeds in the progressive throttle range.

There are some hilly regions where the power curtailment at half throttle becomes objectionable, and provision has been made to allow the fleet user to remove the throttle stop, and by installing a new throttle rod restore full power to the engine. Due to the smaller venturi in the carburetor the acceleration above 50 miles per hour is slightly reduced, and the maximum speed is also reduced approximately five miles per hour.

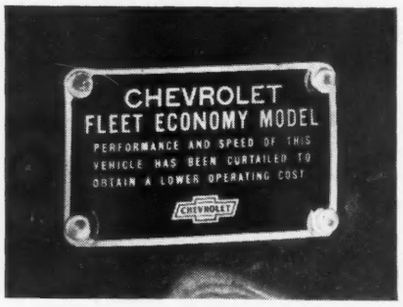
A special sheet steel cover encloses the front half of both the inlet and exhaust manifolds to increase the temperature of the fuel mixture, and the thermostat in the water outlet of the cylinder block is set to open at 162 degrees. A yellow tag is attached to the radiator filler neck, advising the service station attendant that permanent anti-freeze must be used for cold weather protection.

Engine tune-up for this economy model follows regular Chevrolet practice, except that tappet clearances are .010 in. for the inlet and .016 in. for the exhaust valves.

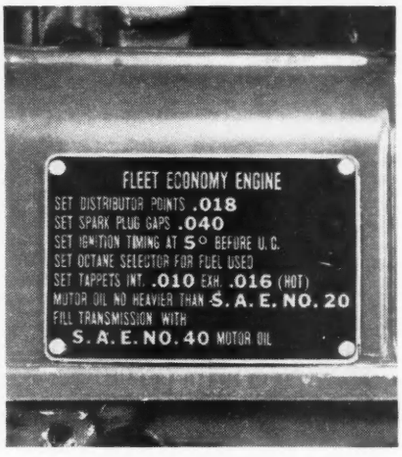
Where desirable, it is possible to have a velocity type governor installed between the special carburetor and the inlet manifold which controls, by one external adjustment, the engine to any



Chevrolet's economy car offers a special final drive ratio


CHEVROLET
FLEET ECONOMY MODEL
PERFORMANCE AND SPEED OF THIS VEHICLE HAS BEEN CURTAILED TO OBTAIN A LOWER OPERATING COST
CHEVROLET

The above plate appears on the instrument board of the Chevrolet economy car advising the driver that the performance has been curtailed for the sake of economy


FLEET ECONOMY ENGINE
SET DISTRIBUTOR POINTS .018
SET SPARK PLUG GAPS .040
SET IGNITION TIMING AT 5° BEFORE U.C.
SET OCTANE SELECTOR FOR FUEL USED
SET TAPPETS INT. .010 EXH. .016 (HOT)
MOTOR OIL NO HEAVIER THAN S.A.E. NO. 20
FILL TRANSMISSION WITH
S.A.E. NO. 40 MOTOR OIL

This plate appears on the rocker arm cover under the hood of the Chevrolet advising the mechanic as to the proper settings for economy performance

desired speed between 1400 and 3000 r.p.m. The vehicle speeds corresponding to these engine r.p.m. varies in accordance with the gear ratio and tire size. The passenger car, with 3.73 to 1 axle ratio, can be set at any desired speed between 30 and 65 m.p.h., while the 1½-ton utility truck, using a 6.16 to 1 axle ratio, can be controlled to any speed between 21 and 45 m.p.h.

This special economy engine is available to fleet users in passenger cars, sedan delivery, ½-ton truck and 1½-ton truck. When it is used with the Master model it has a 3.73 to 1 axle ratio, while with the Master deluxe it has a 4.22 to 1 axle ratio. On the ½-ton, 4.11 to 1 and 3.82 to 1 are optional, and in the 1½-ton utility truck model, 5.43 to 1 and 6.16 are optional.

Economy engine serial numbers are prefixed as follows, when manufactured:

Passenger and Sedan Delivery	"V"
½-ton Commercial	"VK"
1½-ton Utility	"VT"

It is recommended that S.A.E. 10-W oil be used in these economy engines, and nothing heavier than S.A.E. 20 should be used at any time.

In passenger and sedan delivery economy models which have hypoid rear axles, the special G.M. hypoid lubricant must be used in the rear axles, while in the transmission S.A.E. 40 motor oil is recommended.

In the ½-ton Commercial economy model S.A.E. 40 motor oil may be used in both transmission and rear axle.

In the 1½-ton Utility economy model S.A.E. 40 motor oil may be used in both transmission and rear axle when ½ throttle stop is used, but on heavier operations requiring full throttle S.A.E. 90 should be used.

FORD for 1937 has a set-up that gives the fleetman a wide choice of operating economy for different kinds of operation conditions. This year Ford offers two different engines in the same chassis—the 85-hp. V-8 with improved features, and a new 60-hp. V-8 which is almost identical in design but smaller and lighter.

If you operate on city streets or in a wider territory consisting mainly of level stretches, your best bet is the 60-hp. engine on the standard chassis. For passenger car models, the 60-hp. job will be supplied without economy changes of any kind since it is built to develop maximum economy as it stands.

For commercial chasses, the 60-hp. V-8 Ford offers an option of two rear axle ratios—4.44, which is standard on passenger car and commercial chasses; and 4.11, which is an option on commercial chasses only.

Where more power is demanded, as in hilly country, the fleetman will undoubtedly choose the 85-hp. V-8, as this job will give the most satisfactory performance for heavy duty and will yield the best economy under the circumstances.

Recognizing the specific needs of the fleetman, Ford offers some special options on the 85-hp. job. In the first place, the standard axle ratio for both passenger car and commercial line is 3.78, which will be recognized as the previous fleet economy ratio. However, for special fleet requirements and further economy, Ford will supply an optional rear axle ratio of 3.54. The com-

(TURN TO PAGE 94, PLEASE)

TRAILMOBILE

Leads the Way to

SAFER Trailer Brakes

The great disadvantages inherent with remote control braking are overcome with this Lathan power control.
With stored vacuum, it operates on minimum power without frictional resistance of packing, seals or pistons. No pistons to bind, freeze or cause power loss and never the need of lubrication. No cross shafts to bind and rattle loose, no parts to replace—but a simplified, rugged construction that assures positive, equalized braking.
Even with a dead motor or in case of break-away on the road, these brakes hold the load and comply with most rigid state laws.

WHEN that load of valuable cargo and expensive equipment sets out for its destination, you want to *know* that it can *stop promptly* and *safely*—that the load will be under control of powerful and quick acting brakes at all times.

That's why Trailmobile, pioneering as they have, always, in the development of improvements in the trailer industry, were first to use as standard the principle of stored vacuum with leak proof diaphragms.

After more than a year of featuring this faster operating brake power system—after the most gruelling tests in all weather, temperature, and under every conceivable operating condition, scores of prominent users join in agreement that Trailmobile leads the way to more dependable, faster, SAFER trailer brakes.

Largest operators—experienced in operating all types of equipment—specify Trailmobile with Lathan powered brakes.

THE TRAILER COMPANY OF AMERICA

Oakley — Cincinnati, Ohio

(CONTINUED FROM PAGE 92)

mercial job also offers an optional ratio of 4.11 for heavy duty conditions where performance is rated first and economy second in importance.

On the 85-hp. engine, *only*, Ford offers a special economy carbuertor which can be fitted at the factory. This carburetor has 13/16-in. throttle openings with 0.81-in. venturis, and 0.035 jets. The new standard "economy-type" carburetor which Ford adopted earlier in 1936 has 1 1/16-in. throttle openings, 0.097-in. venturis, 0.045 jets.

COMING to Plymouth passenger cars, we find that the fuel economy packages which have been made available during the past few years will be continued. It is claimed on the basis of reports from large fleet users that these economy groups have produced fuel savings of the order of 25 to 30 per cent in some instances.

Plymouth offers two standard economy groups for 1937 models which may be installed at the factory at a very low cost.

ECONOMY GROUP NO. 1—Special intake manifold and downdraft carburetor with a 1-in. nominal size instead of 1¼ in., and a 3.7 to 1 gear axle ratio. With this carburetor the maximum developed horsepower is 65 at 3500 r.p.m. This gives exceptional economy of operation, effecting an average increase of from 15 per cent to 20 per cent. In comparison with a Plymouth of standard equipment, the acceleration of a car with this equipment is reduced 12 per cent to 15 per cent at speeds below 40 m.p.h., and the maximum speed is limited to about 65 m.p.h.

ECONOMY GROUP NO. 2—Consists of following *in addition* to Group No. 1: Hardened steel throttle stop. This normally limits maximum speed of car to from 45 to 50 miles per hour, but may be altered to meet higher speeds if desired—but sealed to prevent tampering.

Manifold heat shields — to increase manifold temperatures. With this group, economies have been increased as high as 25 per cent to 30 per cent.

Caution should be exercised in the adoption of this group No. 2, as in very hilly or mountainous country the limited engine power may necessitate excessive operation in low and second gear, which will offset the economies otherwise gained.

An attractive proposition for 1937

H-W presents a complete line of hydraulic jacks of interest to those who are PRICE WISE and VALUE WISE

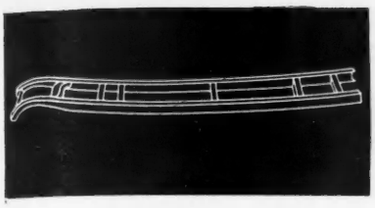
HEIN—marches on! . . . Setting the pace for the industry, Hein-Werner has a new set-up that will look better than ever to you and your customers in 1937. Every model in this line is *built right* and *priced right*, unmatched for design and unsurpassed for performance.

This popular and complete line includes the "Bullet" Model at $2.80 (West Coast $3.10) . . . Light Truck Special, $4.15 (West Coast $4.55) . . . 3 ton models at $6.95 (West Coast $7.45) . . . 5 ton models $8.95 (West Coast $9.60) . . . 7 ton models $11.75 (West Coast $12.70) . . . 12 ton models $17.50 (West Coast $18.50) . . . 20 ton models $30.00 (West Coast $31.00)—and for modern passenger cars, our new BUMPER-LIFT Model at a new low price of $4.95 (West Coast $5.65) . . . Above prices are net to dealer.

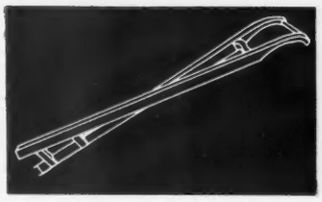
HEIN-WERNER MOTOR PARTS CORP.
WAUKESHA, WISCONSIN

FEW MODELS ENGINEERED TO DO THE WORK OF MANY
HEIN-WERNER
hydraulic JACKS

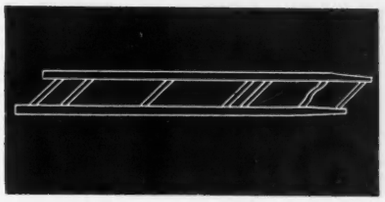
Sagged



Twisted



Diamond-Shaped



is "Tired Steel"

Costing You Too Many Dollars?

STEEL gets tired. The steel used in most truck and trailer frames gets tired too soon. While the body and engine are still good, the frame has given up the fight—"out on its feet." Sagged, twisted, diamond-shaped frames result from tired steel.

Years of daily battering between load and road have little effect on Parish Frames. The steel in them does NOT get tired. It is high-carbon steel—to begin with, and it is heat-treated—virtually spring-tempered—to complete its resistance to fatigue.

That is the main reason why Parish Frames cost less in the lifetime of a truck. It is never necessary to replace bearings and fitted parts worn out from misalignment of the frame. It is never necessary to jack up the frame and reinforce with fish plates. The truck lasts longer, and stays on the road, earning, more days of its life.

That is also the main reason why more fleet operators each year demand that their trucks and trailers be assembled on Parish Frames. It pays. Send for the other reasons.

PARISH

PRESSED STEEL COMPANY

READING PENNSYLVANIA

Pacific Coast Representative: F. Somers Peterson Co., 57 California St., San Francisco, Cal.

HEAT TREATED FRAMES FOR TRUCKS AND TRAILERS

GMC 1937 Line

(CONTINUED FROM PAGE 43)

that GMC engineers have been able to achieve a very important step in motor truck design. By carrying out a principle of design simplicity, they have developed a balanced design in which there is only one basic difference between the conventional and cab-over-engine models. The only major constructional change is that of cab mounting, leaving the chassis and cab details essentially the same. Thus the relation between the power plant and both axles remains undisturbed, although there are a number of minor modifications both in cab and chassis details to suit the new conditions.

Among these modifications, we find a change in the steering column angle; that the shifting lever clutch and other controls have been extended to take care of the forward location of the cab, as well as of the 10-inch increase in the height of the cab. The valve-in-head engines are inclined 18 degrees from the vertical to give the operator the same accessibility to the controls as on conventional models.

THE "Helmet Top" cab which is standard this year on all GMC models is modified to suit the dimensions and styling changes for the COE models. In addition, the gas tank is mounted on the side of the frame and individual bucket-type seats replace the standard seat cushions.

Adjustments and minor repairs on valves, plugs, carburetor, and distributor may be made readily by removing the insulated engine cover and floor boards. In addition, certain engine operations are readily accessible through the large cowl panel doors. For major overhauls, the engine may be removed from the chassis by sliding out at the front end.

All conventional models from the T-14 to the T-61H now have as a feature a special new stabilized front-end mounting in which the radiator core and shell are mounted independently of each other. Improved dual performance rear axles, incorporating the improved planetary and sun gears with positive pinion bearing lubrication, are available as an extra option on conventional and COE models starting with the T-16.

A new tractor package includes, at a group price, those standard options that are necessary for tractor-trailer operation on each model. Included in this package are fifth wheel, brake connections, heavy generator, and lighter capacity front springs and front shock absorbers which are intended to greatly improve riding quality of the tractor.

Apart from the new "230" engine introduced this year, engine specifications remain generally as before. However, all engines feature important improvements.

The "230" engine is L-head, six-cylinder, 3 7/16-in. bore x 4⅛-in. stroke, 229.7-cu. in. displacement and rated 86 hp. at 3500 r.p.m. with compression ratio of 6.2 to 1. This engine has 13 per cent greater torque than the "213" and 2½ per cent additional power. Among the new features of the engine are full-length water jackets for better cooling, ribbed cylinder barrels to prevent distortion, longer valve guides, larger valve lifter, new water pump with automatically adjustable spring-loaded seal and permanently lubricated ball bearings. Vacuum-controlled distributor and inverted fuel pump to prevent vapor lock are other features of this job.

An improved clutch facing is also a feature. This is now a spirally wound asbestos mat without any joint, producing a more uniform texture and greater strength.

The other engines in the group, including the "239," "257," "286," "331," "400," and "450," remain the same except for some important improvements. The specifications will be found in the truck specifications tables. The major changes consist of a new vacuum-controlled ignition distributor on the first three which produces better fuel economy at part throttle; and better cooling. The latter is accomplished by offsetting the water pump and locating the fan in a more central position. On the "331" engine which is used on the T-46, a new water manifold has been provided.

It should be remembered that all engines in the GMC line, except the new "230," are of valve-in-head construction; the "230" is of L-head type.

THE following is a brief summary of the more important chassis features of the entire line:

T-14—wheelbase 112 and 126 in. with increased body loading dimensions, improved three-speed synchromesh transmission, heavier steering gear with straddle-mounted shaft, new sealed center bearing which prevents transmission lube from draining to torque tube, semi-floating rear axle of truck type with ratio of 4.11 to 1. A four-speed transmission is available at extra cost.

T-16—wheelbase 131½ and 157, forward cab mounting, Hotchkiss drive with two propeller shafts with rubber-encased center bearing and three universal joints, heavier steering gear, heavy-duty full-floating axle, four-speed heavy-duty transmission, dual performance axle available at extra cost.

T-16H—wheelbase 130, 155½, and 174¼, forward cab mounting, heavier steering gear with straddle-mounted shaft same size as used on T-23 and T-23H, same front axle as on T-18 and larger front springs, same rear end units as on T-18.

T-18—wheelbase 136, 160, and 178 in., set-back front axle, full-floating rear axle, four-speed sliding gear transmission, dual performance axle optional.

T-18H—wheelbase and other specifications same as for T-18, except heavier rear end units for increased load capacity.

T-23—wheelbase 136, 160, 178, 196, set-back front axle, full-floating rear axle, needle-bearing universal joints, heavy-duty four-speed transmission is standard, optional equipment includes the dual performance axle and a choice of two different transmissions—five-speed overdrive with silent third and overdrive, and a five-speed constant mesh underdrive with silent helical gears. The clutch is single disc, non-shock loading, forced pressure type with vibration dampener. A "239" engine may be specified at a price reduction.

T-23H—wheelbase same as T-23, same features as T-23 except for heavier rear end units. The "286" engine may be installed as an option at extra cost.

T-33—wheelbase same as T-23, heavy-duty full-floating rear axle, heavy-duty four-speed transmission with constant mesh helical countershaft drive, clutch design and overdrive transmission and underdrive transmission follow the same pattern as for the T-23.

Air-operated Timken type heavy cast two-shoe brakes with adjustable levers are optional at extra cost.

T-33H—wheelbase same as for T-23, both this model and the T-33 have booster-actuated hydraulic brakes of fully enclosed two-shoe type. Other features same as for T-33 except that heavier rear end units are used. Air-operated two-shoe brakes available at extra cost—cast two-shoe type Timken with adjustable levers for the front and Westinghouse type with slack adjusters for the rear. In addition to the dual performance axle, this model may be equipped with a special double-reduction axle for slow-speed hauling.

T-46—wheelbase same as above, five-speed underdrive transmission of unit type is standard while a five-speed overdrive and a three-speed auxiliary transmission are available as options, standard rear axle is full-floating type with optional equipment of the dual performance axle and a double-reduction axle. Air-operated heavy two-shoe brakes of cast type available at extra cost—Westinghouse with slack adjusters for the rear and Timken two-shoe

(TURN TO PAGE 98, PLEASE)

Willards

COST LESS TO OWN

—because they last longer
. . . crank faster
. . . don't let you down

WILLARD STORAGE BATTERY COMPANY • CLEVELAND • LOS ANGELES • TORONTO, CANADA

(CONTINUED FROM PAGE 96)

with adjustable levers for the front; booster-actuated hydraulic brakes are standard. The "400" engine is available with this model, but must be used in conjunction with a special heavy-duty package.

T-61 and T-61H—wheelbase ranges same as above, five-speed overdrive transmission is standard, five-speed underdrive is optional, also optional is a four-speed main transmission in combination with an auxiliary three-speed transmission. Double-reduction axle is standard on the T-61 and T-61H, a heavier type being used on the T-61H. Air-operated heavy-cast two-shoe brakes are standard—Westinghouse with slack adjusters for the rear and Timken with adjustable levers for the front. Both models provide the "450" engine as an option.

On the COE models, the main chassis units and heavy-duty options run about the same as for conventional chassis, the major specification difference being in the front axle and steering assemblies, which have been stepped up wherever necessary to compensate for the change in gross weight distribution. Principal COE features are as follows:

F-16—wheelbase 108, 130, 155½, standard transmission is heavy-duty four-speed, full-floating rear axle is standard, and the dual performance axle is optional.

F-16H—wheelbase, 108, 130, 155½, 174¼; other features the same as T-16H.

F-18 and F-18H—wheelbase 108, 136, 160, 178 in., heavy-duty four-speed sliding gear transmission is standard.

F-23 and F-23H—wheelbase 108, 136, 160, 178, 196 in., standard transmission is four-speed, optional five-speed overdrive or five-speed underdrive transmissions.

F-33 and F-33H—wheelbase same as F-23, standard transmission and options same as F-23.

F-46—wheelbase same as above, mechanical features same as on T-46 with auxiliary three-speed transmission used in conjunction with the double-reduction axle as an option for heavy-duty low-speed operation.

F-61 and F-61H—wheelbase same as above, with same special chassis options as T-61 and T-61H.

The Grand Coulee Dam

(CONTINUED FROM PAGE 29)

house, William Warrens, lubricating engineer.

Automotive electrical department, Dave Stevens, electrician.

Truck dispatching, Ralph Hawkins, dispatcher.

The place where most of the truck maintenance work centers is quite an industrial "town," located on a terrace of the embankment immediately downstream from the dam. The terrace is about 100 ft. above the river and about the same distance below the level of Mason City and the administration offices of the company.

The truck and caterpillar shop is approximately 50 by 100 ft. and is located at right angles to the general machine shop, opening at one end onto the welding yard which adjoins it and the machine shop. The shop crane runs a short distance out over this yard and it is convenient to handle heavy pieces between the truck shop and the welding and machine shop departments. Two shifts of eight men each are operated in the truck and caterpillar shop, with three shifts of two men each on field work, maintaining service and looking after minor repairs. These men are all mechanics.

On a construction job of this character, the trucks are operated under conditions that are unusually severe. The loads are heavy and must nearly all be pulled up steep grades. Deep mud is encountered in rainy weather and a very fine, abrasive dust in dry weather. Therefore, the maintenance department must not only make the necessary repairs but must anticipate as far as possible and be prepared for contingencies that may arise.

WE rebuild our own motors, transmission and rear axle assemblies. Two spare White motors and one Mack are kept on hand at all times, together with two White and two Mack rear end units and one transmission unit for each. If a truck comes in with major trouble in any of these three units, the whole unit is pulled and a spare put in its place, so that the truck can get get to work in the shortest time. The removed unit is then repaired and becomes a spare. All heavy trucks are given an extensive overhaul every 16 months.

Our policy is to grind all valves every 60 days on all motors regardless of apparent condition. But this 60 days is equivalent to about a year's operation under ordinary conditions. It has been found to work for better performance to have a shut-down period in the operation of trucks every week-end for 32 hours. During this period, all servicing and major repairs are made that do not come under the head of emergency. All engines are governed. All trucks are equipped with Westinghouse air brakes.

In the way of anticipating shop repairs, we have found it effective to have a field mechanic make frequent and regular checks of every piece of heavy equipment in the field. He carries check blanks, which enumerate parts to be checked for condition. If repairs are found that cannot be taken care of by the field service department, and the machine has to come into the shop, the check sheet beats it in by a considerable margin. The shop crew is, therefore, informed in advance of what they are going to be called upon to remedy and can be fully prepared. The shop does all of its own automotive machine work, main bearings being line bored.

THE question is sometimes asked if it is possible for the manufacturer to develop equipment to meet conditions of a specialized nature, such as are encountered on construction jobs. It would be possible, of course, for them to do so. But this would seem to be rather the problem of the manufacturer who studies the demands of his market and should know when there would be sufficient outlet for a new standardized type sufficient to warrant its production. In our case, we have found the commercial truck of today a very good piece of equipment to start with, and then we change it and rebuild it where necessary to fit our particular conditions. We have not so far ordered specially designed equipment for our job. Speaking of changes, however, here are some of the things we do in the way of revamping such equipment:

(1) Air tanks taken off frames and mounted on running boards to reduce vibration.

(2) Reinforcing of frames that were breaking (all makes). More weight of metal welded on at weaker points.

(3) Revamp front axles and raise them three inches higher. This almost eliminated front axle breakage, giving better distribution of load which had before been too much to the front.

(4) Fabricated our own White radiator shells in the welding shop from sheet steel. Former cast shell broke when subjected to bouncing rocks. Also made considerable saving in cost over new shells.

(5) Fabricate our own fenders and hoods using heavier metal than in the original design. This saved much injury from flying rocks.

(6) Springs reinforced with extra leaves (five more in rear and two more in front, doing away with much breakage).

(7) Increased load capacity of bodies by welding pipe to upper edges.

A large stock of repair parts is maintained, which will inventory close to $25,000 on the average. Practically every part of trucks and tractors that is not a heavy fabricated part is car-

(TURN TO PAGE 100, PLEASE)

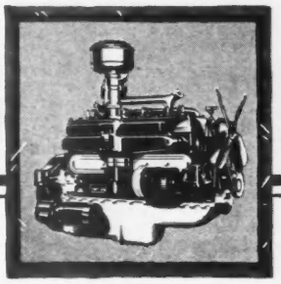
WINTER HIGHWAYS KEPT CLEAR WITH HERCULES POWER

When snow flies, hundreds of communities depend on Hercules Power to sweep away the drifts—to clear roads and streets for traffic. Leading makers of trucks and tractors, used for the gruelling task of snow removal, select Hercules Engines—both gasoline and Diesel—because these engines are engineered to operate smoothly and surely with simplified maintenance. The dependable character of Hercules Power, its rugged, long life, is being proved daily on the highways, on the farms and in the oil fields of the world. Hercules Engines are the product of over twenty years' experience in designing and building heavy-duty power plants exclusively. This unusual experience is available to all manufacturers of powered equipment.

HERCULES MOTORS CORPORATION, CANTON, OHIO

America's Foremost Engine Manufacturer • Power Plants from 4 to 200 H. P.

HERCULES ENGINES



(CONTINUED FROM PAGE 98)

ried in this stock, including generators, carburetors, starters and similar unit equipment in addition to supplies. Three stock clerks are necessary and one supervisor. Every part from a washer up is passed out over the stockroom counter and a record made of the part and the machine upon which it is to be used.

IN addition to the 39 pick-up trucks reporting to the east side garage, there are 13 company-owned passenger cars. This transportation department is now getting onto a well organized basis. Last year the troubles were rush and poor roads. The west side coffer dam was being excavated so that concrete placing could be started. Everything was subordinated to that. Now that this phase of the work has been completed and the contractor roads brought up to a higher standard, it is possible to anticipate by frequent overhaul much of the trouble that then occurred previously.

Overhauling of light trucks is based on mileage rather than time. We are giving a complete overhaul every 15,000 miles, and valve grinding coincides. Lubrication of light trucks is on a schedule of every three days for the ½ and 1½ ton trucks, amounting on the average to every 300 miles. It is a complete lubrication service. This is frequent, but it pays, especially since the truck gets a thorough inspection at the same time. All machine work and welding in connection with this equipment is done in the main machine shop, as in the case of the heavy equipment.

A RECENT development with us has been the establishment of a modern tire repair department, which is part of the light equipment transportation department, although the work done is upon all tires. This tire repair shop is said to be as complete as anything to be found west of the Mississippi. Whether or not this is true may be judged from the following line-up of equipment:

One tire spreader. (This machine will take tires up to 13.50/24 and is operated by air pressure.)

One mold. (This will take anything from 700/20 up to and including 13.50/24. The range of sizes is obtained by changing the top, bottom and side plates.) One mold taking tires up to 700/20.

Steam for the molds is developed by a 1½ hp. boiler, while steam for the steam bags is developed by a 1/3 hp. boiler. The large boiler is fired by an oil burner. Section repairs and spot and reinforcement repairs are made here, but no retreading. The capacity of the shop per 8-hr. shift is seven tires of all sizes, on the average. Three tires can be put through the large mold in an 8-hr. shift.

As nearly as can be estimated in the limited time in which the shop has been in operation, the saving over commercial repairs, previously made in Spokane or Wenatchee, Wash., is about 50 per cent. In addition to that, there is the saving in transportation charges to these places. About 6 hours was required for a round trip by truck to either point.

Another time and money saver in connection with the light truck transportation department is a steam cleaning outfit recently installed. This will be especially useful in winter months.

EXTREME heat conditions and the pulling of heavy loads long distances in compound gears present many problems in lubrication. In the first year of operation, when the west side coffer dam area was being excavated, the going was largely through heavy clay, up hill, with loads up to 15 cu. yd., at 3500 lb. to the cu. yd. This presented a problem especially in the rear ends. This was solved by the use of an extreme pressure lubricant.

On all heavy trucks, the oil level is checked every seven hours, and drained every seven hours. Filters are used and oil is reclaimed to be used as hoist oil. On very hard pulls, the checking is done as often as every three hours. One lubrication truck makes the rounds of the whole operation day and night, with enough grease monkeys to keep up the schedule. There are six of them on the truck, and others scattered around over the job who do not stay on the truck.

There are five separate oil houses on the work: The main oil house; one at the gravel pit; one on the Ryan dump; one at the east side excavation; and one for small trucks and passenger cars at the pick-up truck and passenger car maintenance shop. Oils and greases are distributed regularly to these various oil stations, but no gas. Gas service is obtained at one fuel pump, which is located in front of the main oil house. It is either delivered direct to the trucks here or through a service truck with a 500-gallon supply. There is also a 500-gallon supply tank on a sled that is used on some locations, and where trucks can obtain gas as they pass.

At the present time, the consumption of fuel and lubricants will amount to a monthly average as follows:

Gas	90,000 gal.
Internal combustion automotive oils, not including Caterpillars	3300 gal.
Industrial lubricating oils	13,000 gal.
Automotive greases	3200 gal.

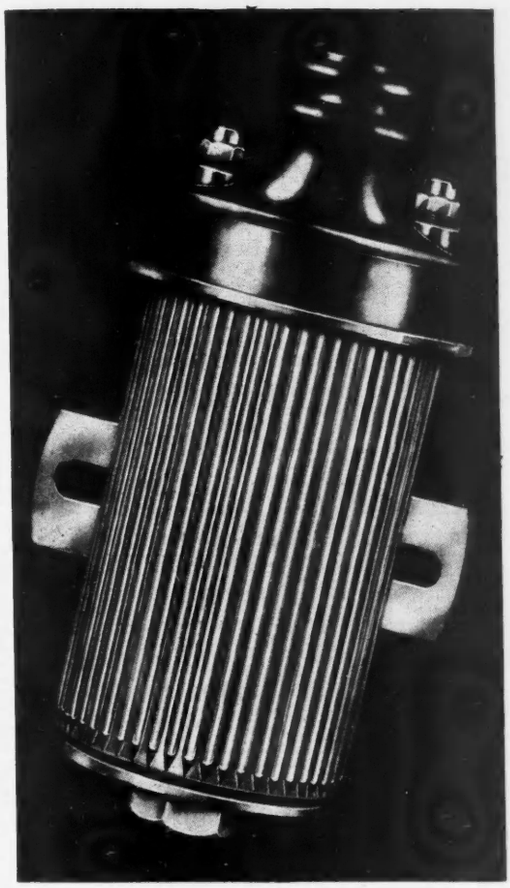
In addition to the lubricants carried in the main oil house, which go out in small quantities, the oil company delivers barrel lots out onto the job from its stock of petroleum products (in fact, the company maintains a major plant at Grand Coulee). But all petroleum products of any quantity whatever are cleared through the main oil house, under the supervision of the lubricating engineer and his assistants. They do the ordering. The operatives on the job cannot order special lubricants without first checking with the lubricating engineer, who in turn checks as to the advisability and cost.

Incidentally, the M-W-A-K company in the handling of its lubrication problems, as in all other departments of the work, operates on the principle that the cost of materials is secondary to operating efficiency.

Every gallon of gas and every gallon of lubricating oil and grease out of the oil house is ticketed to the particular truck or car taking it. These tickets enable us, if required, to ascertain the gallons per hour of operation of every automotive vehicle. We believe this is preferable under the conditions to figuring in miles per gallon. Oil and gas are figured in the main for groups of equipment, as a general check on operations, as for instance: Mack trucks, International trucks, Caterpillars, etc. However, the records are complete enough to bring them down to individual pieces of equipment if desired. If a report comes in that a particular truck or caterpillar tractor seems to be using an excessive amount of fuel or grease, this report can be verified. If so, it is reported to the grease truck crew and an immediate investigation is made. If necessary, the equipment is sent to the shop and a remedy applied.

APPROXIMATELY 12,000,000 cu. yd. of concrete are going into this dam. Men and machines never built anything as big before. Only a million and a half cu. yd. have gone in thus far. The present rate is 7000 cu. yd. per day. The cement is produced and trundled down hill over a mile-long conveyor belt system. Cement is blown down to one mixing plant and then across the river to the other through pipes 11 in. in diameter and over a mile long, under 100 lb. air pressure. "Seems to be stealing the work away from the trucks," you say. This may be true to a certain extent, but there is still plenty for them to do. To them and the steam shovels and draglines belongs the downright drudgery—the hard, thankless task of moving dirt and muck and rock. I have a profound admiration for the modern truck and truck driver. Without them, I don't see how a job of this size could be tackled with hope of success.

25 years IN THE MAKING



P&D SUPER DYNAMIC COILS and CONDENSERS

are new in design, sensational in performance . . . a logical result of our 25 years' experience as basic manufacturers of ignition parts.

"Perma-sealed" against moisture-penetration and current-leakage. Cooled by *air*. More power. Longer life to contact points. These and other superior features of Super-Dynamic coils could not have been evolved in a day—or a year!

We are proud that a quarter-century of "knowing how" has enabled us to give you coils that perform better—and *sell* better!

Cold Weather Starting Demands Perfect Ignition

P & D MANUFACTURING CO., INC.
LONG ISLAND CITY, N. Y.
Basic Manufacturers of Genuine P & D Ignition Replacement Parts since 1910

GENUINE P&D IGNITION PARTS

SMOOTH TIRES Are OUT!

Here's How to Add Thousands of Safe, Profitable Miles to Bald Tires

★ Grooves New 1937 Tread on Bald Tires in 5 Minutes.

★ Job Done Without Removing Wheels.

★ Fool Proof-Requires No Skill.

America brands "Bald Tires Public Highway Enemy Number One." Their cost in property damage alone runs into millions. They are condemned by state, county, city and public opinion. The State of Pennsylvania is taking a definite stand against this menace, with a certainty of other states following. Fleet owners here's your way out:

THE ROLL-ABOUT GROOVER SOLVES YOUR PROBLEM

Hundreds of tests by fleet operators prove that the *Roll-About Groover* adds thousands of safe miles to "bald tires"; that it's the most practical, economical and fastest tire groover on the market. Don't experiment. Don't take chances. Remember accidents eat up profits.

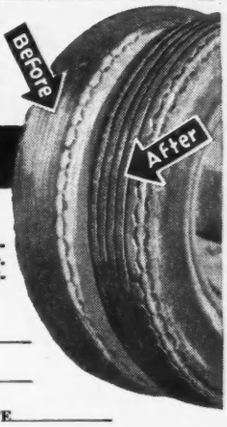
BE ON THE SAFE SIDE—THAT'S THE PROFIT SIDE

Save yourself money and worry. Don't shoulder the liability of operating on "bald tires." Find out about the inexpensive, efficient *Roll-About Groover* today! *Mail coupon NOW*. No obligation.

A Few Well-Known Users of Roll-About Groover

Firestone Tire & Rubber Co.
Goodrich Rubber Co.
General Tire Co.
Fisk Rubber Co.
Goodyear Rubber Co.
Penna Rubber Co.
Lee Tire & Rubber Co.
Standard Oil Co.
Sun Oil Co.
Tide Water Oil Co.
Atlantic Refining Co.
Public Service Of N. J.
Pennsylvania Highway Department
Westinghouse Electric Supply
Follmer Trucking Co.
Norristown Motor Freight
Gimbel Brothers
Freihofer Baking Co.

BEFORE AND AFTER USING ROLL-ABOUT GROOVER



SAFE TOOL MFG. CO.

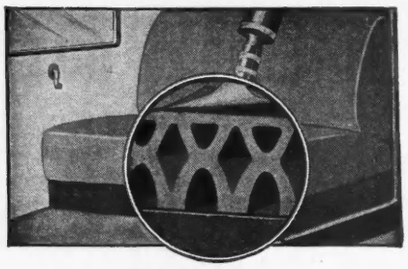
DEPT. 100 - BRIDGEPORT, PA.

Gentlemen: I want a demonstration of the inexpensive Roll-About Groover as soon as possible. It is understood this places me under no obligation of any kind.

NAME_____

ADDRESS_____

CITY_____ STATE_____



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SEAT CUSHIONS
SAVE You Money

Black Diamond **All-Rubber Seat Cushions and Back Rests actually cost *less* in the long run than any others you can buy, because cushion replacement and upkeep costs go out when Black Diamonds go in your truck. Scientifically designed for comfort as well as heavy-duty service. Extra value you can see, measure — *and prove to yourself.* Available for all sizes and models of trucks. Write for prices.**

KARPEX MANUFACTURING CO.
1424 E. 19th Street Indianapolis, Ind.

"Extra" Features
Are Standard On
WILMINGTON
COMPRESSORS

Tucked into a corner, this Wilmington Compressor makes itself felt all over the shop in work done faster, easier, cheaper. It stays in order. Check valve opens and stays open while motor runs, can't pound itself to pieces. Unloader prevents burning out motor. Intake filter prevents piston wear. Big bearings last years. Valves in cages for quick change prevent long shutdowns. Timken oversize bearings. It's a honey! Send for details.

AUTO
Compressor Co.,
Wilmington,
Ohio

GROOVING CUTS MILEAGE COSTS

Follow the leadership of these big fleet operators who know that Kwick-Kut groovers mean lower tire costs:

Associated Oil (Calif.)	Cincinnati Street Railway
Shell Petroleum	Brooklyn Edison
Standard Oil	New York Edison
Milwaukee Street Railway	Ph. Dietz Coal Co. (Brooklyn)

There's a Kwick-Kut Groover for every requirement.
And don't forget to write for full details on our new non-skid safety blade.

KWICK-KUT MANUFACTURING CO.
3840 Arsenal Street
St. Louis, Missouri

Drivers Okay Equipment

(CONTINUED FROM PAGE 27)

had a minimum of six hours rest since I made my last trip. I agree to obey the following safety rules: Not to exceed 35 m.p.h., stay 500 ft. behind other vehicles; stay on my side of the road, not try to pass other vehicles on hills."

And the Inspector certifies that—"I have inspected this unit and it is O.K."

THERE were remarkable results from the first use of these cards. Within three days we knew more about the actual condition of all our units of equipment than we had learned during the previous six months. The new cards had made every driver responsible—and honest. The driver, before leaving the garage or terminal, must guarantee that his vehicle was safe to operate. Every vehicle either went out guaranteed or was returned to the shop. All the work now done in the shop was easily charged to individual cars. It afforded an immediate cost check on all our units of equipment, and we had a practical follow-up check on every driver. This program enabled us easily to develop new cost distribution methods. All new items demanded by law were charged as equipment. All other items were classified either as maintenance or safety.

This plan doubtless has had considerable effect on the safety record of

Keeshin Transcontinental Freight Lines, Inc.
Unit Inspection Outbound

Terminal _____ Date _____

Time Inspected and Left

Tractor _____ Trailer _____ Truck _____

Following items have been inspected on units shown, prior to leaving terminal or garage and are O. K. and serviceable.

Head Lights	____	Brakes, Foot	____
Front Marker Lights	____	Brakes, Emergency	____
Rear Marker Lights	____	Rear View Mirror	____
Tail Light	____	Wheel Studs	____
Side Marker Lights	____	Seals	____
Tire Inflation	____	Spare Tire	____

Following equipment was in my possession in serviceable condition at time of departure.

3 Pot Flares, Filled	____
6 Railway 10 Minute Red Fuses	____
3 Red Lanterns, Filled	____
Side Marker Lights, Red and Green	____
Fire Extinguisher, Filled	____

Exceptions, if any _____

I have personally inspected the units listed above and accept them as being in good condition and safe to operate. I have had a minimum of six hours rest since making my last trip. I agree to obey the following safety rules: Not to exceed 35 miles per hour; stay 500 feet behind other vehicles; stay on my side of the road; not try to pass other vehicles on hills.

_____
Driver

I HAVE INSPECTED THIS UNIT AND IT IS O. K.

_____
Inspector

This card must be turned over to Inspector at time of departure without fail. Driver will not take unit out until inspected and card signed. Not necessary to show Seal Nos. All items must be checked.

Driver inspection form discussed in story

The Park Plaza
H. B. CALDWELL, Manager
Single from $3.50 Double from $5

OSHKOSH
4 Wheel Drive Trucks
A proven product. 1½ to 10 ton capacity. Write for complete information.
OSHKOSH
Motor Trucks, Inc.
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McCORD REFRIGERATION
—FUEL SYSTEM
FOR TRUCKS
REFRIGERATION
AT NO COST
—BY THE FUEL
THAT RUNS THE MOTOR
●
McCORD RADIATOR AND MFG. CO.
DETROIT

By ANY Standard of Comparison...

THE YEAR'S OUTSTANDING ALL-WHEEL-DRIVE TRUCKS

Write for New 1937 Literature, Specifications and Prices

Marmon-Herrington Company, Inc., Indianapolis, Ind.

MARMON-HERRINGTON

For running-in new and rebuilt engines use auxiliary lubricants containing "dag"* Brand colloidal graphite.

Acheson Colloids Corporation

Port Huron — dag — Michigan

*REG. U. S. PAT. OFF.

JONES PORTABLE TACHOMETER

The world's largest operators of commercial vehicles use Jones Portable Tachometers to check engine speeds, for tune-ups, and setting governors, etc. Here are a few: Standard Oil Co., of La., N. J., N. Y.; Shell Petroleum Co., Atlantic Refining Company, Tidewater Oil Company, Keeshin Motor Express, Mack Trucks, Brockway, U. S. Navy.

Direct, instantaneous reading.

JONES - MOTROLA - NEW YORK
450 WHITLOCK AVENUE

TRADE **YALE** MARK

DIRECTION SIGNALS FOR TRUCKS, BUSES AND AUTOMOBILES

TRADE **YALE** MARK

SAFETY FLUSH TYPE HANDLE FOR AUTOMOBILES, TRAILERS, TRUCKS AND AIRPLANES

THE YALE & TOWNE MFG. CO
Detroit Division
12340 Cloverdale Ave. Detroit, Mich.

BRAKES?

1. Doubled Load Capacity
2. Tripled Lining Life
3. Permanently Equalized

with

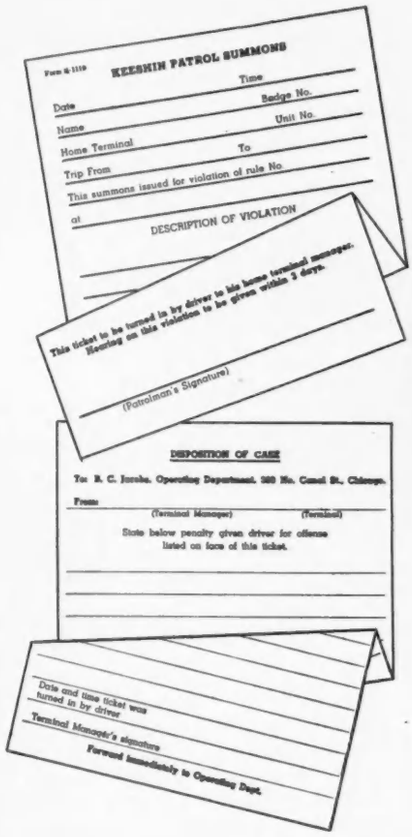
LINDERMANS

A drum full of lining and the same pressure under every square inch.

Send for catalog 101-2c.

LINDERMAN DEVICES, Inc.
149 Broadway, New York, N. Y.

the company during the past two years, although our previous safety record was comparatively very good. During five consecutive annual Interfleet Drivers' Safety Contests sponsored by the Chicago Safety Council—the last one ending June 30, 1935—our fleet operating in Chicago received the highest annual


KEESHIN PATROL SUMMONS
Time
Date
Badge No.
Name
Unit No.
Home Terminal
To
Trip From
This summons issued for violation of rule No.
at
DESCRIPTION OF VIOLATION
This ticket to be turned in by driver to his home terminal manager. Hearing on this violation to be given within 3 days.
(Patrolman's Signature)
DISPOSITION OF CASE
To: R. C. Jacobs, Operating Department, 360 No. Canal St., Chicago.
From:
(Terminal Manager) (Terminal)
State below penalty given driver for offense listed on face of this ticket.
Date and time ticket was turned in by driver
Terminal Manager's signature
Forward immediately to Operating Dept.

Showing patrol forms used in summoning drivers

safety award in the "Transfer, Cartage, Storage" group. And it is interesting to note that in the last of these annual contests, the Keeshin Chicago fleet of 136 vehicles had only 22 chargeable accidents for 1,691,000 miles, or a rate of 13 accidents per million miles. This contrasts with an average accident rate of 45.3 for all of the 183 Chicago fleets, with 10,344 vehicles, in that contest; and even this general average of 45.3 represented a decrease of nearly 40 per cent below the city-wide average for the first of the Annual Chicago Interfleet Drivers' Safety Contests—five years previously—that the company entered. Due to abnormal reorganization activities, our company did not officially compete in the 1935-36 contest, though our final compilation of records indicates that we would have continued in a high place among the winners.

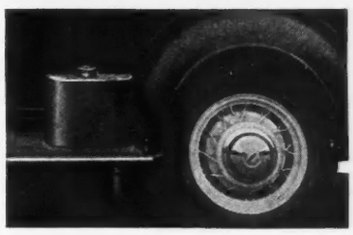
THE recital of these safety records is not meant to suggest that we think our safety problems are solved. Far

Give Your Men a Fighting Chance!

with the

LINTERN
Junior
SANDER

for Salesmen's Cars and Light Delivery Trucks



BY equipping your cars with these sanders you gain protection against skids — one of the most common of all motor accidents.

You also make other important savings, such as: lowered chain costs, less tire wear and reduced maintenance. Your men can easily maintain schedules.

The Lintern Junior Sander sits on running board and is adaptable to practically any coupe, coach or light delivery truck. It is extremely simple to install. Complete directions accompany the sander.

Write for folder. Contains illustrations, full particulars and price. Benefit by the savings of this efficient unit.

Lintern SANDERS

THE LINTERN CORPORATION
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DIESEL
MOTOR TRUCKS

STAMINA
Stamina is built RIGHT INTO Sterling Diesel Motor Trucks. That's why they are the choice of so many Pacific Coast Truck operators. Powerful, fast, low in upkeep and operating costs, with a wide choice of models and wheelbases, Sterling Diesel Trucks will give you exactly the motor truck performance you are looking for. Write today for specifications.

STERLING MOTORS CORPORATION
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THE SPECIAL honeycomb construction of the Spongex Sponge Rubber Seat Cushion for Trucks and Buses, gives exceptional riding qualities.

The total air space within the cushion is so great, that there is no "packing" of the rubber under the severest shocks. Vibration is effectively absorbed, too. Spongex Cushions have no metal in them—removing all danger of injury. They can be counted on to last as long as the vehicle in which they are installed.

For Prices and Description Address Dept. C

SPONGE RUBBER PRODUCTS CO.
DERBY • CONNECTICUT

Series 900
WALKER
Hydraulic Jacks

Give you extra value features for car, truck or bus equipment and heavy duty bench work or shop jobs. One of ten sizes—capacities 1½ to 20 tons—at left. Order from your jobber—and see the complete line of Walker Jacks for every service need.

WALKER MFG. CO.
Racine, Wisconsin

from it. As previously stated, our new unit inspection plan to fix responsibility on the individual driver has practically eliminated accidents due to the mechanical condition of the unit. And our rear end collisions on the road were reduced to practically nothing when we equipped each unit with red fuses to use when an outfit is stalled on the highway after dark.

But there have been other operating and safety problems. Perhaps the most important of these relates to the recent averaged increases in the speed of trucks on the highway, due to pneu-

COPY OF THIS FORM COMPLETELY FILLED IN AND SIGNED BY TERMINAL MANAGER, MUST ACCOMPANY EACH AND EVERY VEHICLE ACCIDENT REPORT SENT IN

Copy to B. C. Jacobs, Chicago, Illinois
Copy to Operating Manager of your division

Driver's Home Terminal_____ Date _____

Type of Accident_____ Was our driver at fault_____ (yes or no)

Discipline accorded driver

Discharged_____

Laid off_____ (Time off)

To pay cost of accident_____

Estimated cost-claimant's damage_____ Estimated cost-our unit_____

Your confidential version of accident_____

SIGNED_____
Branch Manager
Subject to review by Chicago office

Typical accident report used by Keeshin

matic tires, better highways, and the stress of competition. Naturally, this new condition affected many of our older drivers trained to heavier equipment and slower speeds. To meet these new conditions, our company early in 1936 started a general driver training program. All of our 75 terminal managers scattered in some 15 states, who had four or more drivers, were asked to appoint their best qualified driver to act as a dual tester and instructor of all other drivers. All drivers who had been with the company for less than six months were given a two or three day (or a trip) test and instruction period, without pay.

TRAINING was also given to all drivers who had had an accident of any sort within six months, unless the instructor and the terminal manager both thought, beyond a doubt, that this driver came up to our driver standards. And for any driver who seemed especially to need it, this training period was prolonged. At the conclusion of the test period for each driver, the instructor was asked to fill out an individual confidential report. This report is in the form of about 30 "yes" or "no" questions which, in the total, present quite a complete driving and character analysis of the driver. The last two questions are very direct, as follows: "If you owned the outfit this man is going to drive would you hire him as one of your drivers?" "Do you approve this student as coming up to the standards of a Keeshin driver and as being

VALVES
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PISTON PINS
VALVE GUIDES
VALVE SEAT INSERTS
CYLINDER SLEEVES
PACKLESS PUMPS
CHASSIS BOLTS
TRYON SHACKLES
SILENT "U" SHACKLES
ECCENTRIC and RUBBEROD TIE RODS
OILITE BUSHINGS

Thompson Products

THORNTON
Dual Ratio Four Rear Wheel
DRIVE
FOR TRUCKS!
Is setting new records
THORNTON TANDEM CO.
Detroit

THIS IS THE NEW VEL-VAC HAND CONTROL VALVE

NOW $11.75 Complete. With mounting bracket, gauge, and hose fittings.

The V-33 De Luxe Model illustrated insures improved trailer brake control, calibrated braking progression, instantaneous application and release, hair trigger action matched with dependability. Write today for new Vel-Vac Manual on Power Brakes and accessories. It's free.

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1646 W. Lafayette Blvd., Detroit, Mich.

DOUBLE SAFETY
POSITIVE TRACTION
DOUBLE MILEAGE

McKay Multi-Grip
Double-Bar-Reinforced
Truck Chains
THE McKAY COMPANY
McKAY BLDG. PITTSBURGH, PA.

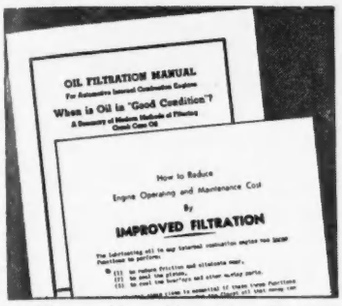
BLOCKS
SHOES
ROLL LINING
SEGMENTS

Amco BRAKE LINING

FOR TRUCKS
BUSES
TRAILERS
AND CARS

ASBESTOS MANUFACTURING COMPANY
HUNTINGTON, INDIANA

THESE TWO MANUALS FREE!



Each Shows How You Can Cut Motor Maintenance and Operating Costs 30% OR MORE!

THE Briggs Oil Filtration Manual and four-page condensation discuss oil contamination, prove the need for a scientifically-designed filter to keep oil "refinery pure" in actual service.

They show how dirty oil "ups" motor maintenance and operation costs, how the BRIGGS CLARIFIER, proven by scientific tests to keep oil pure, can lower engine operating and maintenance costs 30% or more.

Write for a *free* copy of either manual.

THE BRIGGS CLARIFIER CO.
3262 K Street, N.W. Washington, D. C.

Motor Tune-Up is a real profit and business building service.

Send for free Tune-Up Charts

CARTER CARBURETOR CORP.
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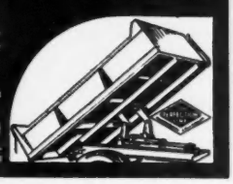
STANDARD OR SPECIAL PURPOSE
DUMP BODIES
OVERSIZE HYDRAULIC HOISTS
WRITE FOR BULLETIN AND PRICES
THE PERFECTION STEEL BODY CO.
GALION, OHIO



FLEET SCHEDULES HELD with
WONDER WELD

No need for costly 30-hour fleet delays to repair valve port and inside cylinder cracks. Wonder Weld puts an end to the trouble in 30 minutes.

MILLER MFG. CO.
1218 KAIGHN AVE. CAMDEN, N. J.

qualified to operate one of our units safely?"

All terminal managers were also notified that "in the future all drivers hired must go through this same student training and testing period and be approved by the instructor before they are given a run or are allowed to operate one of our units, regardless of how much experience they have had previously. A written record in duplicate, approving or disapproving each driver, shall be kept and signed by the instructor." At some of our larger terminals two instructors were appointed. And for testing drivers at terminals having less than four drivers, special instructors are appointed.

IN order to strengthen the feeling and the understanding of every driver that our company is pledged to the highest standards of mechanical efficiency and safety for its equipment, a short time ago I sent a personal letter to each of the 1500 drivers in our entire system. A part of the letter was as follows:

"Under no circumstances are you, or any Keeshin driver, required to pull a defective unit out of any terminal. You have my authority to refuse to take a defective outfit on the road and you will not lose your job for not taking it out.

"I am expecting each driver to use good common sense on any cases that come up. However, should any case arise where the driver and mechanic cannot agree on the condition of a unit, the question will be referred to your superior. If he states the unit is safe have him sign your trip card to that effect."

Each and every vehicle accident must be promptly reported in detail by the driver and this report must be accompanied by a brief confidential version of the accident by the Branch Manager, including a "yes" or "no" answer to the question: "Was our driver at fault?" Also a statement by the manager as to the "discipline accorded driver," which discipline may be in one of three forms —discharged, laid off for a definite time or pay the cost of the accident.

IT is our policy carefully to select a high type of driver, or potential driver. Then this driver is tested and trained for his duties, and we try to keep him satisfied and efficient in his work. Our discipline for accidents very seldom could be called "severe," that is, we seldom discharge a man or lay him off for a long period. Our investigation of an accident is not in the form of a court trial to inflict a sentence, but to train the ignorant or the careless driver to become a better driver. We try not to discourage potentially good drivers, but

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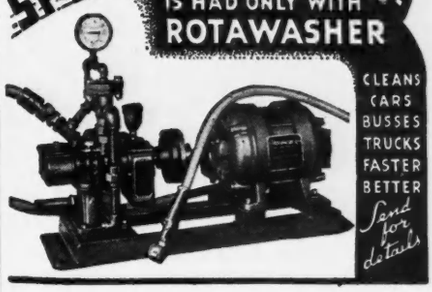

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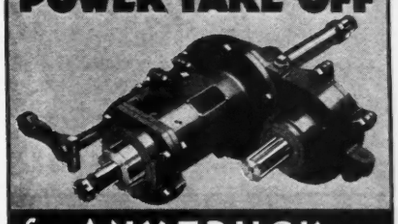
HERCULES
SPLIT SHAFT
POWER TAKE-OFF



for ANY TRUCK . . ANY PORTABLE EQUIPMENT

Hercules Split-Shaft Power Take-Offs are not transmission take-offs. They are installed in the drive shaft to transmit all of the power of the truck motor direct to any portable equipment. Various models available to operate as direct drive or from the side.

Consult Hercules Engineers with your Power Take-Off requirements.

HERCULES STEEL PRODUCTS CO.
GALION, OHIO, U. S. A.
ALSO MANUFACTURERS OF DUMP BODIES AND HOISTS

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FOG BREAKER

Drills through fog to give sight of road ahead for thirty to sixty feet. No-light-loss lens. Flat fanned beam
Weather - tight door. Husky bracket welded and riveted on. Fixed focus can't jar off. 5 ft. weather-proof wire. $3.00 at your jobber's. Write for catalog of better truck lights.

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One that will meet the engine's filtration requirements. Its initial low cost and low cost of cartridge replacement, assures you of economical engine lubrication. Mechanically the cartridge is protected so that it will not collapse at cold motor starting or high oil pressures. Dirt accumulations once trapped in the cartridge cannot get back into the oil system. Less than one minute is required to change the cartridge without so much as soiling the hands.

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DASH-CONTROL GOVERNOR
THE MOST SENSATIONAL SAFETY ACHIEVEMENT OF 1937.
Wire, 'phone, or write for details now.
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KINNEAR TRUCK DOORS
Also Doors for Buildings

ALL METAL . . . . . Coils like a window-shade, out of the way . . . . .
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BURGLAR PROOF
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MORE DURABLE
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to help them. Each accident is settled on its merits and we have no hard and fast rules. In general, we believe it is the better plan to ask the driver to pay the cost of an accident that is proved to be his fault, rather than to lay him off. Thus he can continue to provide a personal or a family income, while he may be paying, say five or ten dollars a month until the total is met. Most of such accident penalties are quite small. The very largest amount that I remember was fifty dollars.

All of our new drivers must pass a physical test made by our own doctor. The most common disqualifications are from weak heart, hernia, stiff joints, or poor vision. We hire no drivers under 21 years, and the most usual age is 25 to 35. However, we do not disqualify an applicant because he is 40 or more; for some of our best drivers are beyond 40. We consider as very important the mental attitude of the driver. That is, we want drivers who are satisfied with their job.

WE try to carefully guard the physical condition of our drivers. Hence nearly all of our runs are from 150 to 200 miles, and the driver then returns to his home terminal. We require that the driver must have at least six hours of rest between runs. We have most of our trouble with the "cocky" type of driver, and we try to train our drivers always to be cautious and even "suspicious" of every hazard situation, and never to fight for "the right of way."

Our Director of Safety, B. C. Jacobs, has instructed our terminal managers to plan safety meetings for their drivers at least once a month. We have started a program to give our own safety award buttons to all drivers who have no accidents through a six-months' period. The first of these periods ended June 30th. At present we are engaged in developing a bonus incentive plan for our drivers, to be put in effect in 1937.

AS a help in keeping our safety ideals before each and every driver, we maintain several road patrol cars. These patrolmen may turn up anywhere, and they are instructed to serve "arrest tickets" on the spot, if they observe faulty driving. They are also instructed to tie in their activities with the local city and state officials, whenever they thus can work to the benefit of our highway operations. Also, all of our terminal managers are advised to spend considerable time scouting about at night, to observe the road habits of their drivers, and they are instructed to correct driving faults on the spot.

When a driver reports an accident, the terminal manager is instructed to hold a hearing on this accident within

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FITZGERALD GASKETS

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THE DEARBORN LINE
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Radically lower in height—
Completely streamlined front end—
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HOSE CLAMPS
THE HOSE CLAMP WITH THE THUMB SCREW
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HYDRAULIC HOISTS for BODIES
There's a St. Paul Hoist to fit every need. Distributors conveniently located in leading distributing centers . . . stocked and ready to make prompt shipments.
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● A metal faced plywood panel of high quality for building better panel bodies.

Armorply is the lightest panel of its type available. It is faced with rust resisting galvanneal steel, and has a hard birch back.

Write for samples, prices and full information.

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—the trucks that are "BUILT TO MEET A CONDITION"
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...Shoulders the Battery's Burden...
Write for booklet that tells how
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SURE-FIRE POWER

A sure-enough light-heavy, this Blackhawk AA8.5! 4½ ton capacity. 8½" low, 17½" high. Handles any truck in intermediate class. Fast, reliable, with smooth, EASY lifting—like all Blackhawk Hydraulic Jacks. Ask your Jobber Salesman. Write for literature.

BLACKHAWK MFG. CO.
Dept. CCJ-1, Milwaukee, Wis.

BLACKHAWK

three days, when the driver is given an opportunity to defend himself. This is a part of our general program to place responsibility for his driving methods, and for the mechanical condition of his equipment, on each individual driver. This responsibility must be supervised and enforced by the immediate executive superior of the driver, subject to review by our headquarters Chicago office—for success in a fleet safety program is not only a question of training the drivers but also a question of training the management.

Studebaker 1937 Line

(CONTINUED FROM PAGE 45)

outer panel combining strength and rigidity with smart appearance. The corrugated floor is reinforced with flanged channels running crosswise at 17-in. intervals. Stake pockets are provided in flare boards at front and rear.

Its interior appointments feature built-in warm air windshield defroster, ash tray, arm rests, adjustable seat back, automatic choke control, controlled ventilation. Another important feature in this field is the installation of two-stage rear springs which provide passenger car riding quality.

This new Studebaker coupe-express has a wheelbase of 116 in., and is powered with an L-head, six-cylinder Studebaker-built engine. Its power development is 90 hp. at 3400 r.p.m. The frame is X-girder, double-drop type. The standard frame is the I-beam conventional type and Studebaker planar independent front wheel suspension is available. There is a synchro-shift transmission, and the economy of automatic overdrive is available for operators who desire it. The gasoline tank has a capacity of 18 gal. Tires are 6.00/16 front and single rear. Wheels are 16-in. disc on all models. Steel spoke wheels are available. The battery is 15-plate, 105 ampere hour.

The three-passenger cab is of the coupe type. The doors are 36 5/6 in. wide at their greatest width.

Perfection Builds New Plant

Plans are being completed for a modern new factory and office building to house the Perfection Steel Body Co.'s body and hoist operations at Galion, Ohio. The new structure will replace the old plant occupied by Perfection for 17 years and which was destroyed by fire last month. Arrangements have been made to continue production in temporary quarters for the period of the construction of the new plant so that there will be no shortage in the supply of Perfection equipment. Distributors are reported to have ample stocks on hand. Officials of the company have expressed particular appreciation for the cooperation extended to them by other manufacturers during the present emergency.

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● HOLDS SECURELY
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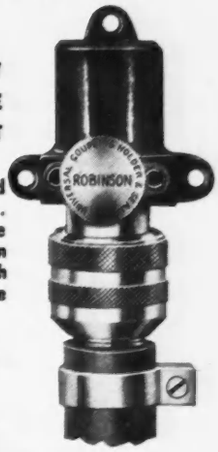

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$1.25 LIST PRICE

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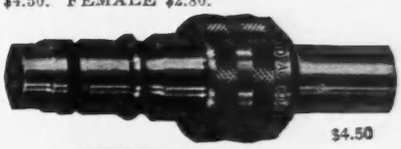
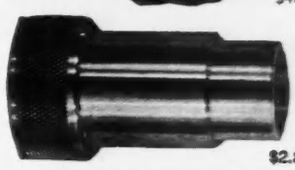
Connected . . . *Autovac* is fully open! Disconnected . . . *Autovac* is tightly closed! No valve to turn off . . . nothing left to chance. Saves time and money. Autovac protects hose lines and mechanism from water and dirt . . . it's automatically sealed when not in use.
Furnished in 3 sizes ⅜, ½, ¾ inch. MALE $4.50. FEMALE $2.80.


$4.50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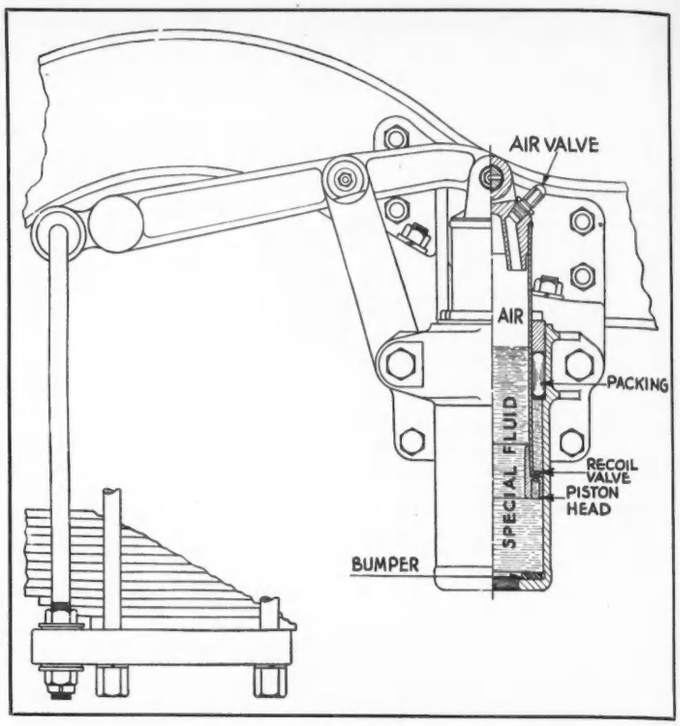
Cle-Air for Easy Riding

Combined Shock Absorber and Air Cushion is Especially Designed for Commercial Vehicles



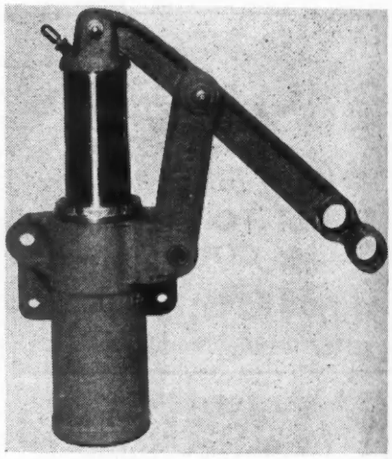
At left is a detailed drawing showing the operation of the Cle-Air cushion shock, and below it is shown the completely assembled unit.

A COMBINED air cushion and shock absorber (or spring damper) for commercial vehicles, known as the "Cle-Air" has been placed on the market by the Cleveland Pneumatic Tool Co. It is specially designed for use with the rear spring of trucks, tractors, trailers and buses. As an air cushion it works in conjunction with the regular (steel) chassis springs, relieving the latter of a part of their load, while as a damper it controls the rebound. By means of a suitable bracket the device is secured to the chassis frame, in such a position that the rod connecting its arm to the axle is substantially vertical. This rod has a travel range of about 10 in., which is just twice the piston stroke. When the device is being mounted it is so set that with a normal load upon it the piston is still about ½ in. from mid-stroke. A load of anywhere between 500 and 1000 lb. may be carried on the "Cle-Air," depending on the pressure to which it is inflated. Damping is effected by forcing the fluid through an orifice.

It is well known that with an air cushion the rate varies increasing with the deflection, in contrast to a steel spring, in which the rate is constant throughout the range. It is therefore claimed for the air cushion that it can be made very soft around the neutral point, the point of compression under static load, and still take care of severe road shocks.

Referring to the sectional view reproduced herewith, it will be seen that the device consists of a cylinder containing a piston. The latter comprises a length of tubing which is welded to a yoke at its upper and screwed to a piston head at its lower end. The piston head, which is a good sliding fit in the cylinder, is of considerably larger diameter than the tubular part of the piston, so that an annular space is formed between the latter and the cylinder bore. This space communicates with the space in the lower part of the cylinder and in the hollow piston through a recoil valve. When the spring compresses this valve opens wide automatically, allowing free flow of the fluid from the cylinder into the annular space, but on the recoil it closes and then forces the fluid to pass through an orifice in the valve.

A special packing ring, of a material used for aircraft shock absorbers, is inserted between the cylinder and the tubular part of the piston, being held between a disk resting against a shoulder in the cylinder bore and a bearing nut. At the bottom of the cylinder there is a bumper ring of oil-resisting synthetic rubber. Air pressure is pumped up in the cylinder through an air valve screwed into the yoke or piston cap.



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